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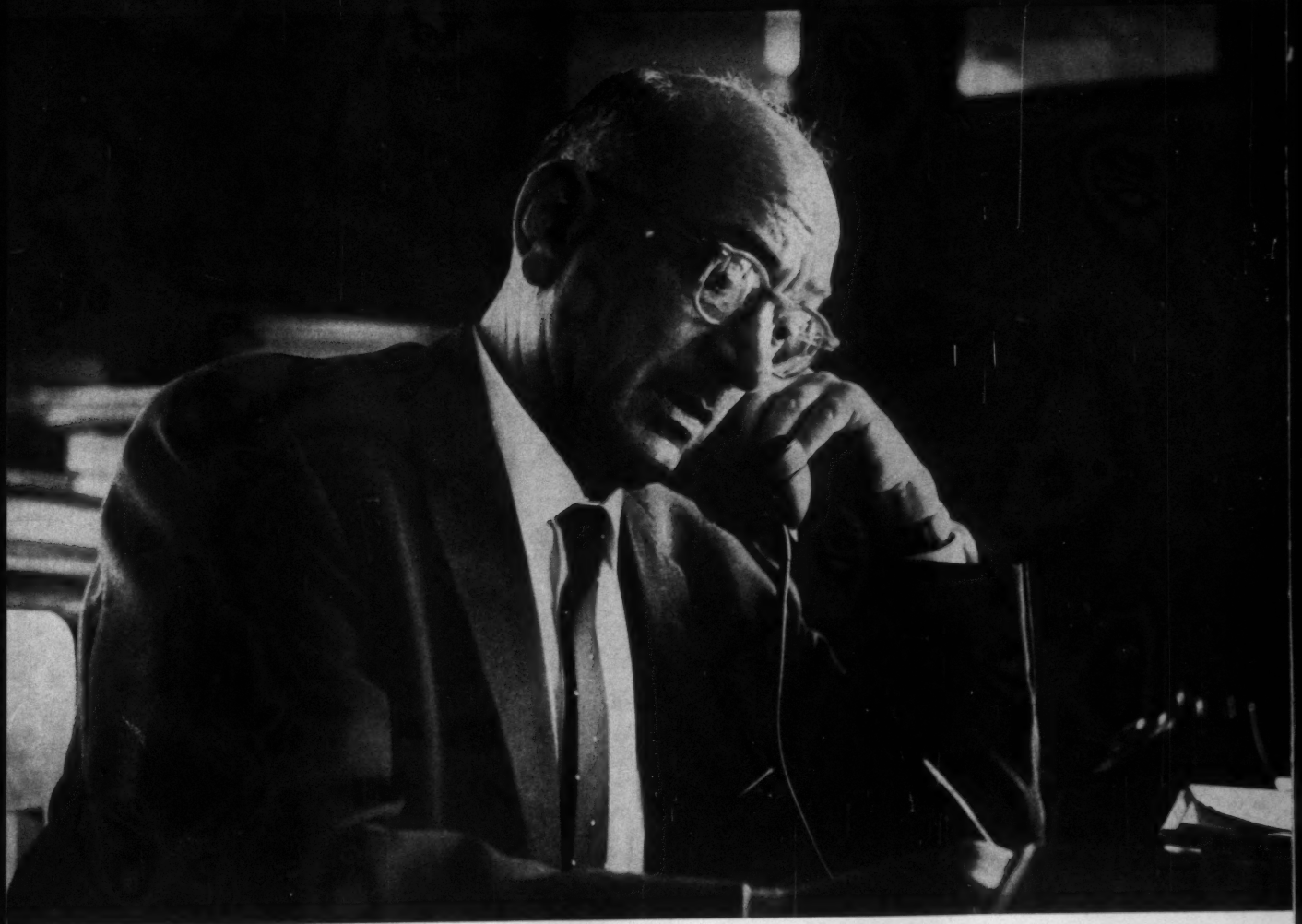

Jacob Feld: Success in failures p.50

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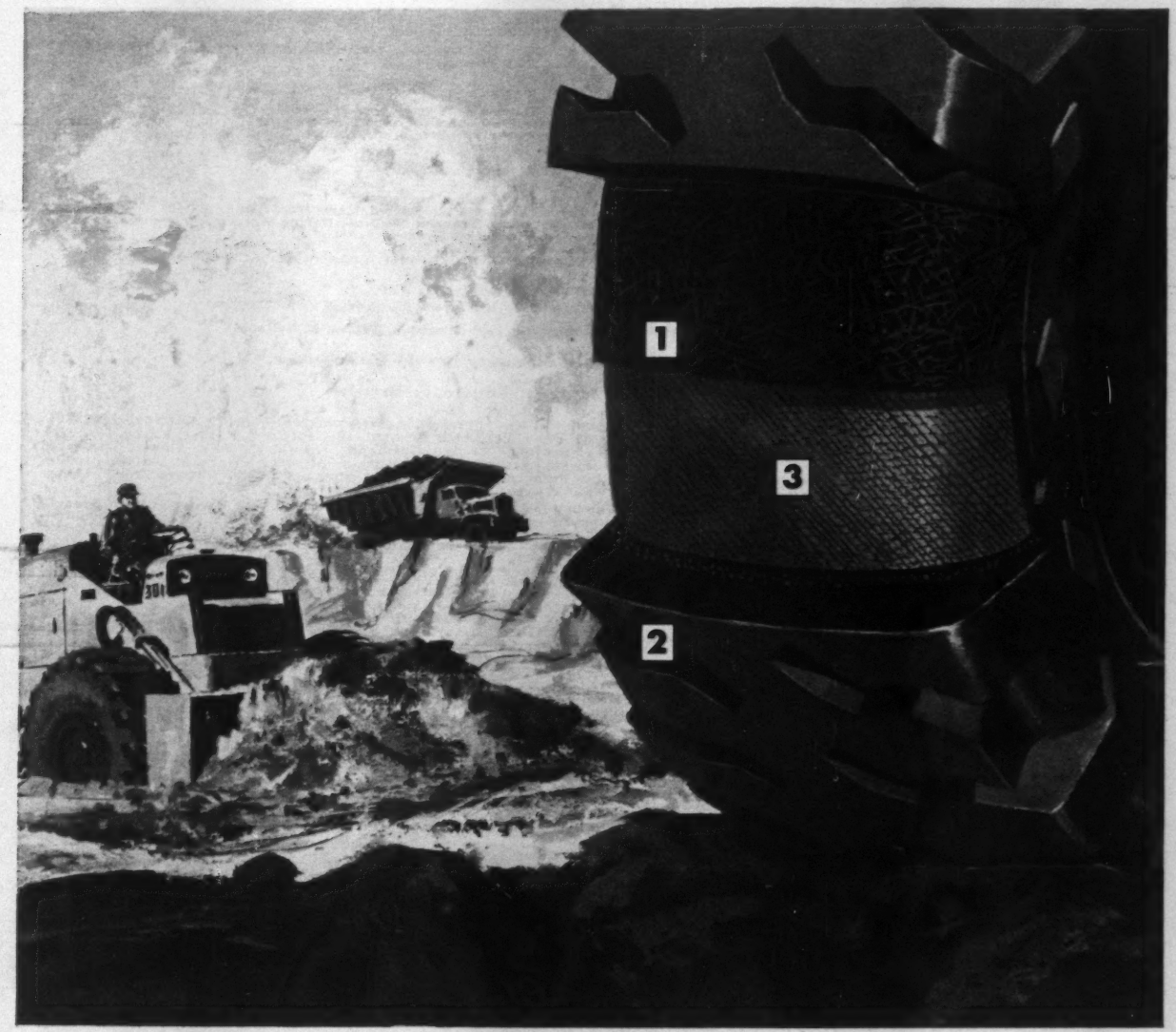

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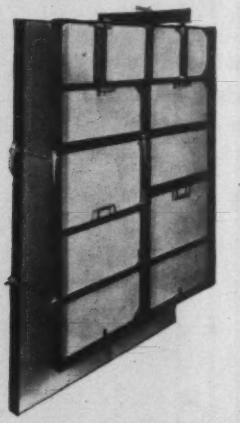
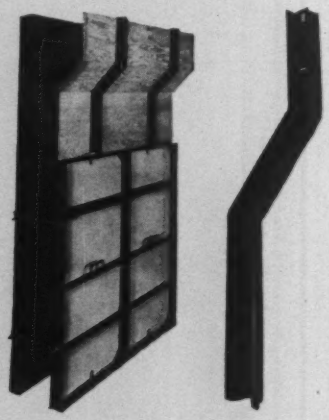


Symons cantilever bracket

Purpose of the cantilever bracket is to support inside form work and thus allow a difference in form heights for a monolithic wall-slab pour. An economical way to pour swimming pools, sewage treatment plants, and any other type work requiring a monolithic wall and base slab pour. Designed particularly for use with Symons Steel-Ply Forms.



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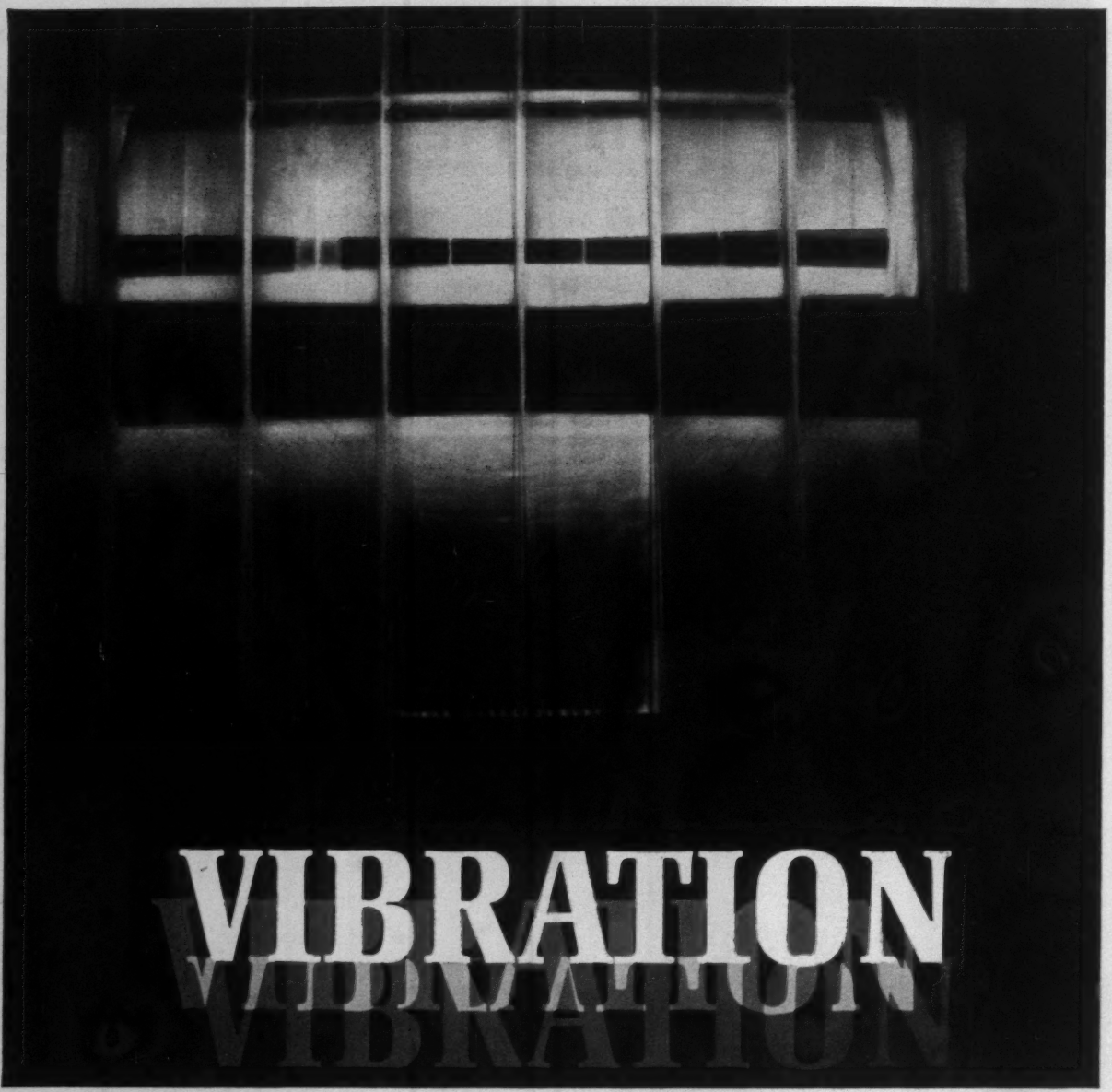

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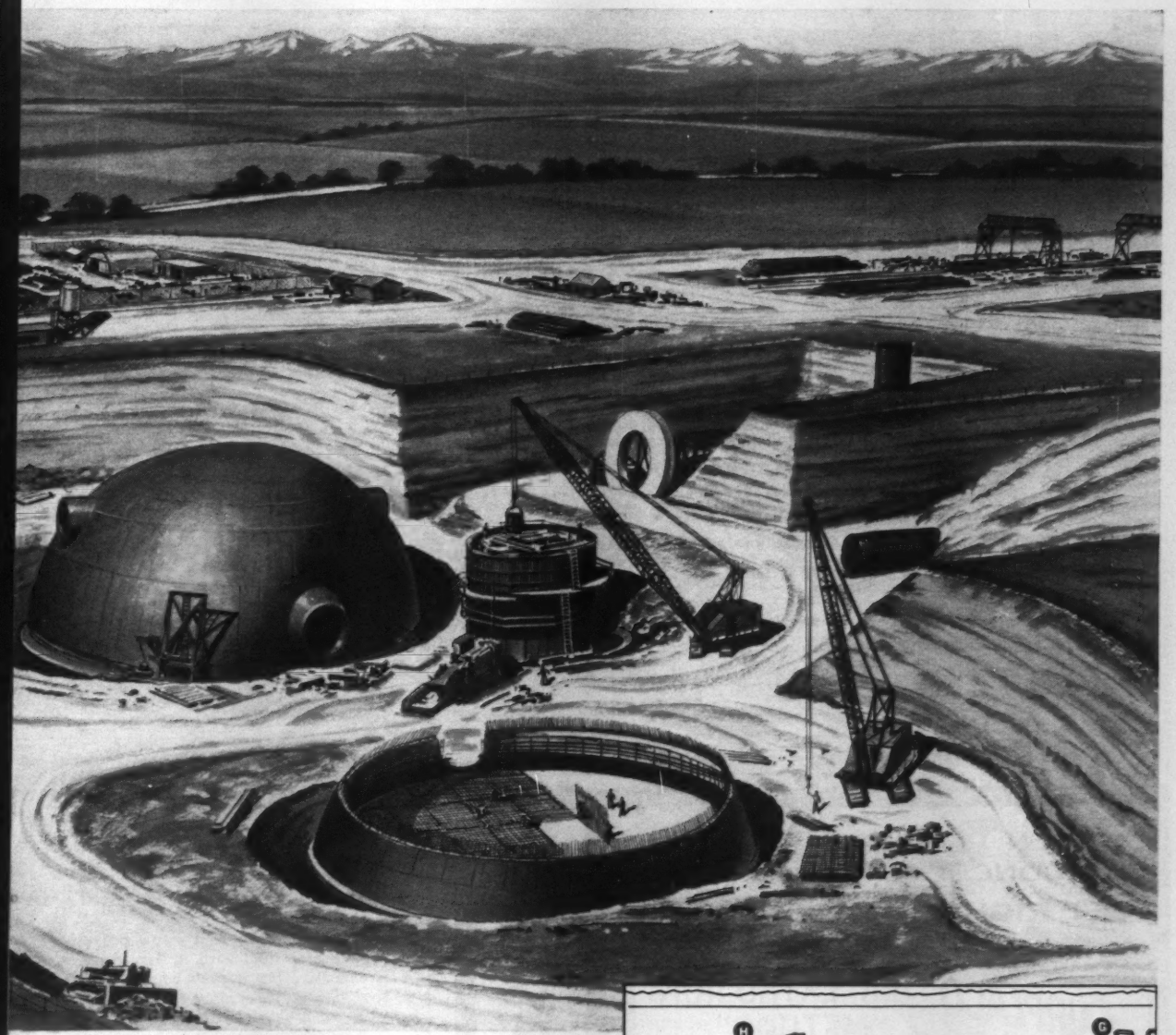
Titan underground missile base uses CF&I Steel Products

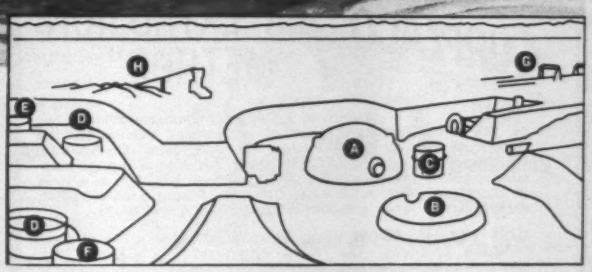
Vital to America's defense will be this completely-underground ICBM installation on the Lowry Bombing Range near Denver. It will comprise six complexes—one of which is pictured above—and each will be ready to fire three 98-foot long Titans. In building the complexes, which will occupy 875 square miles, the Corps of Engineers has used a variety of CF&I Steel Products — products known for their dependability.

CF&I Grader Blades and Cutting Edges gouged out huge excavations in which the installation will be buried. Thousands of tons of *CF&I Reinforcing Bars* fortify most of the concrete structures, including the launching silos and support installations. *Cal-Tie Wire,* in handy dispensers, was used to tie the rebars together.

Throughout the project, *CF&I-Wickwire Wire Ropes* were chosen for cranes, steam shovels and hoists, because these ropes have extra-high breaking strength and provide longer service life. *Realock Fence* and *CF&I Field Fence* guard the excavations and police "off limits" areas.

CF&I-Clinton Welded Wire Fabric was specified to give an additional steel backbone to many concrete structures, making them as "shock proof" as possible. The bases of the powerhouse and control center are further reinforced with *CF&I Hard Drawn Prestressed Concrete Wire for Redrawing. CF&I*





A Power House
B Control Center
C Portal Silo
D Launching Silos
E Equipment Terminal
F Propellant Terminal
G Rebar Forming Yard
H Sand and Gravel Quarry, Concrete Batching Plant

Prestressed Concrete Strand and Wire were also used in the concrete bridges on the entry roads.

CF&I Industrial Screens were selected for many sand and gravel separators. And *CF&I Galvanized Steel Strand* is prominent as guy wire on utility poles.

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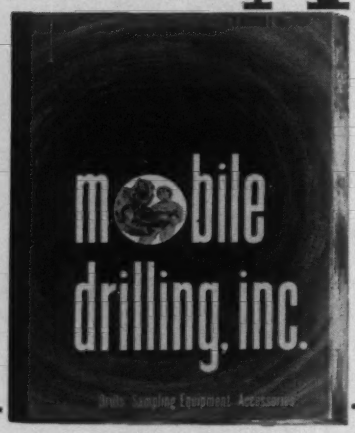

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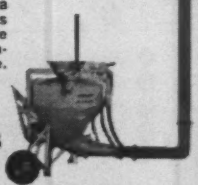

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Reader Comment

More Web Steel

SIR—It is stated in the article on the new earthquake design manual of the Portland Cement Association (ENR Oct. 5, p. 56) that the specifications have been based on the principle that "Members must have enough transverse web reinforcement so that their strength is governed by ductile flexure and not by shear." This applies also to blast-resistant design and has been achieved by the standard design practice in all countries except the United States.

It is also reported that "the increase in building costs will be minor . . . to sustain even the most severe earthquakes," despite the addition of some steel over the ACI 318-56 standard requirements. Previously, such slight increase in cost was also shown for blast-resistant construction.

Sufficient web reinforcement, as is standard in other countries, has resulted in satisfactory behavior of reinforced concrete structures for any reasonable distribution of the moment steel. It has also increased the ultimate loads, because it made possible the redistribution of bending moments.

The ACI web steel specifications should also assure a similar factor of safety for all of our structures. And since "the increase in building costs will be minor," bringing up the web steel everywhere to the world's standard should be very easy indeed.

LOUIS BALOG
Consulting Engineer
Binghamton, N. Y.

Wrong Foot Forward

SIR—Oh, come now! I know property on Wilshire Boulevard in Los Angeles is expensive but it can't be that expensive yet.

In the article (ENR Sept. 28, p. 28) it is stated "property on Wilshire Boulevard runs from $6,000 to $8,000 per sq ft." Assume a plot 50 feet by 50 feet, or 2,500 square feet. At the low rate of $6,000 per sq ft that would come out to a price of $15 million for the site alone. Am I right? I believe you meant "front foot."

EDMUND B. BESSELIEVRE
Dallas, Texas

Editor's Note—Mr. Besselievre is correct.

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

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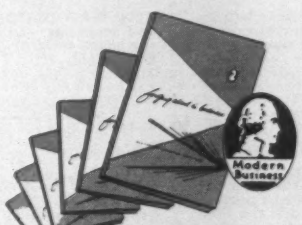

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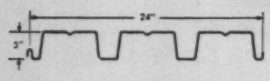

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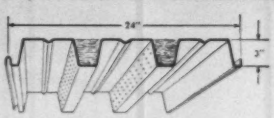

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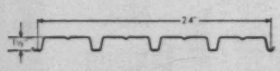
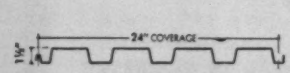


A-DECK — For purlin spacings not exceeding 8'4". Narrow ribs provide deck surface that supports the thinnest or softest types of insulation.

H-DECK — New! For simple spans to 20'0" — 3" and 4½" depths. Especially practical to cover walkways in shopping centers, schools, other installations. Also available in Acoustideck.



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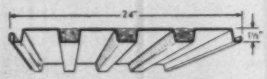

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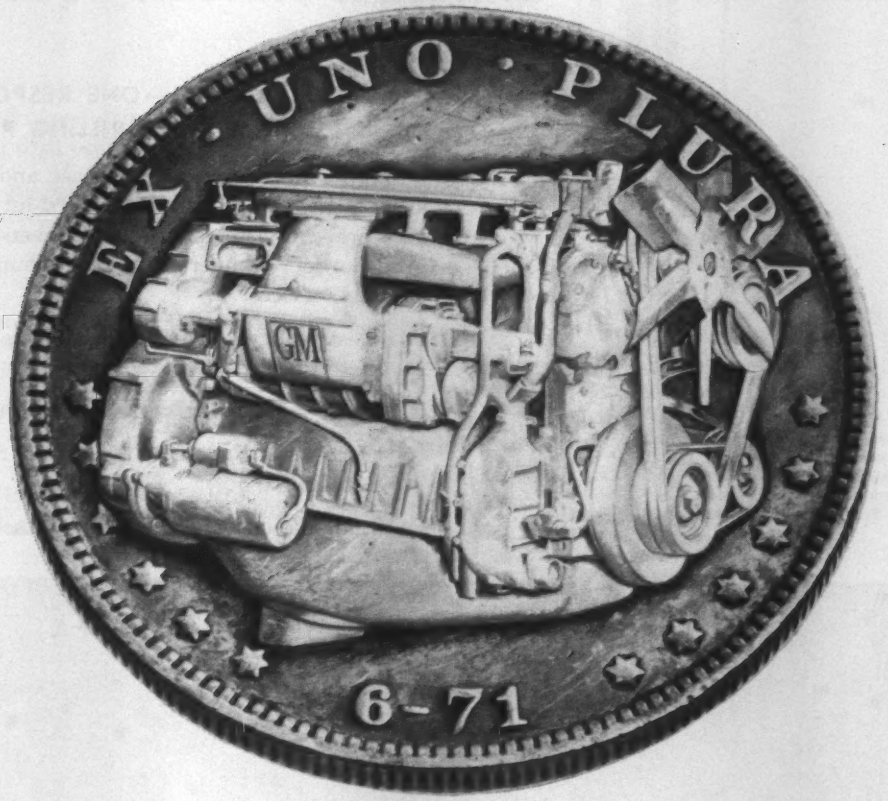

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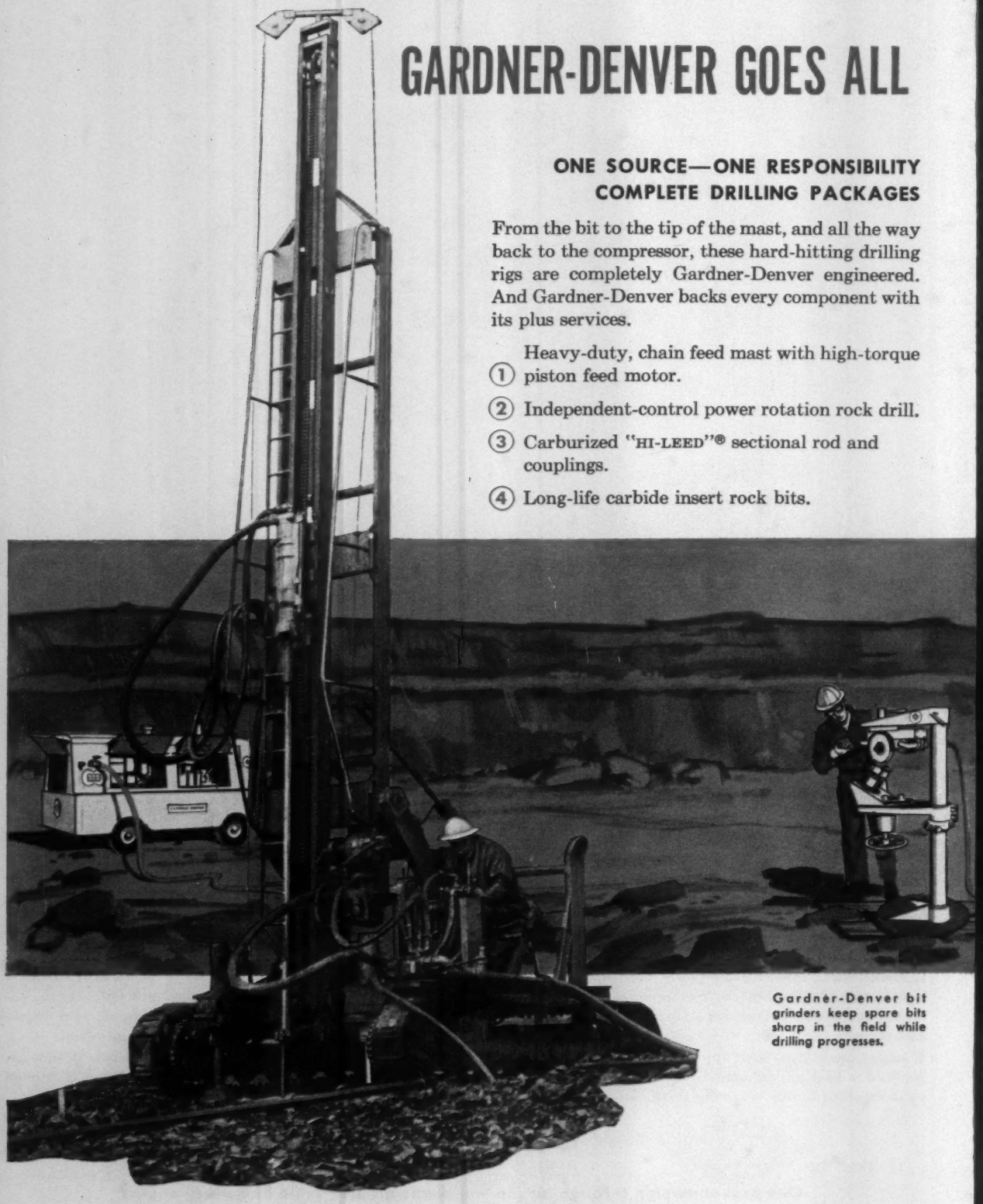

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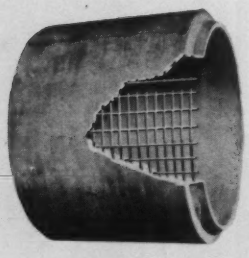

Steel reinforced

for longer life in storm sewer service!

Concrete pipe reinforced with strong USS AMERICAN Welded Wire Fabric solves drainage problems.

Albuquerque, like most southwestern cities, is spreading out. You see new construction almost everywhere you look. This photograph shows some of the activity that goes into transforming the wide open countryside into new residential areas. It was taken in the North East Heights development and shows the laying of reinforced concrete pipe for a storm sewer. In this project, approx. 17,000 lineal feet of reinforced concrete storm sewer pipe from 24″ dia. through 72″ dia. was laid.

The pipe shown is 72″ pipe, and every foot of it was *steel-reinforced* with USS AMERICAN Welded Wire Fabric to give it the strength and durability to withstand heavy loads and assure long service life. It was pre-tested to meet the rigid requirements of ASTM Specifications C76-57T, and will withstand loads exceeding 100,000 lbs.

A large number of concrete pipe manufacturers are using USS AMERICAN Welded Wire Fabric to get greater strength and durability. This quality wire fabric is made on precision machines to the closest of tolerances ±0.003″—with center to center spacings held to ¼″. It is prefabricated from cold-drawn, 60,000 psi min. yield strength wire. All intersections are electrically welded to assure positive mechanical anchorage in the concrete. For more information about USS AMERICAN Welded Wire Fabric—write American Steel and Wire, Dept. 1453, Rockefeller Building, Cleveland 13, Ohio.

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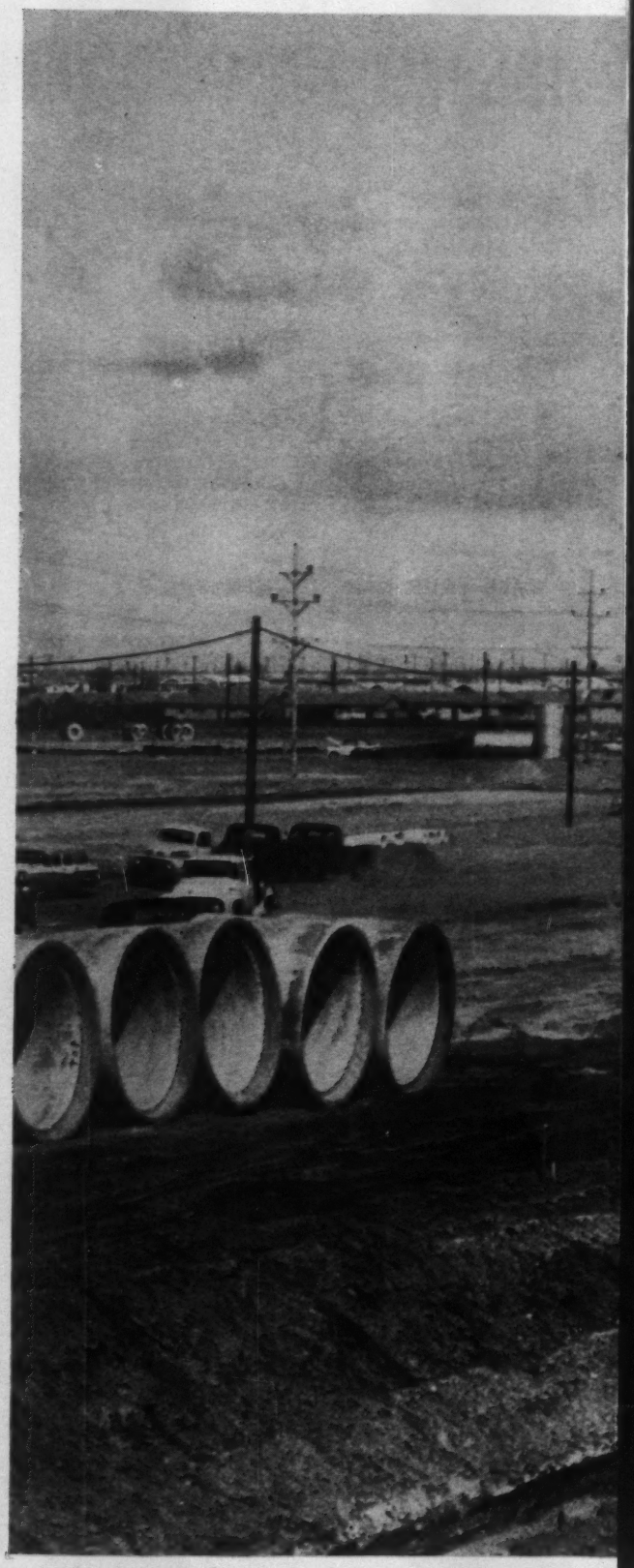

Project: Storm Sewers, North East Heights, City of Albuquerque, N.M. **Engineers:** Gordon Herkenhoff & Associates. **Contractor:** C. R. Davis Contracting Company. **Product:** Reinforced Concrete Pipe ranging in size

from 24" to 72" dia. Reinforced with USS American Welded Wire Fabric.
Manufacturer: Pipe by American-Marietta Corporation. Reinforcement by American Steel and Wire Division of United States Steel.

This mark tells you a product is made of modern, dependable Steel.

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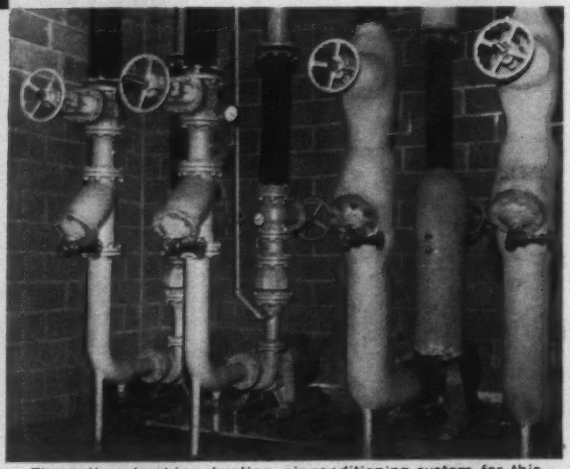

The entire plumbing, heating, air-conditioning system for this 300-bed hospital is controlled by Jenkins Valves.

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THE CONSTRUCTION WEEK

NEXT BUDOCKS CHIEF—It's a sure bet now that Rear Adm. Eugene J. Peltier will retire as Chief of the Navy's Bureau of Yards and Docks on February 1—to find a new career in some industry management post. And it's as certain that his successor's last name will start with C. The favorites: Peter Corradi and W. C. G. Church, both rear admirals. Best long-shot: Rear Adm. H. Garner Clark.

NEW JOIST ERA—Three new series of steel joists—J, LA, and H—will be fabricated from A36 steel; H series joists will be fabricated from high-strength steel (50,000-psi yield strength). For specifications and load tables write to the Steel Joist Institute, Suite 715, DuPont Circle Building, Washington 6, D. C.

NO CHANCE—Investment circles say the Massachusetts Turnpike Authority stands no chance of selling bonds to finance construction of the road's extension into Boston. Investors rejected two such offerings this year; a third faces the same treatment. Even construction as a federal-aid freeway is distant, since Republican Gov. John Volpe must first get an authorization from the Democratic legislature.

WHICH INDEX DO YOU READ?—The Bureau of Public Roads reports its new bid price index for federal-aid highway construction (ERN Sept. 28, p. 21) jumped 2% in the third quarter to 95.1 (1957-59 equals 100). In contrast, the old composite mile index (1946 base) fell 1.1% in the same quarter.

RULES CHANGE—Recommendations for changes in Philadelphia's methods of letting public works' contracts, designed to avoid future scandals, are expected before the end of the year. A special committee of architects, engineers and city officials has studied the problem for three months. Expected as a major proposal: tighter specification limits on design and construction changes after contract award.

STAYING IN THE BLACK—The construction division of Merritt-Chapman & Scott Corp., New York City, operated at a profit in the third quarter and nine-month period ending September 30. This is a sharp reversal of events in 1960, when construction hit the company with a huge loss.

WHICH WAY FOR THE JOINT BOARD?—The resignation of Richard J. Mitchell as chairman of the National Joint Board for the Settlement of Jurisdictional Disputes, effective December 31, indicates that the Board may be headed for trouble. Mr. Mitchell says the chairman's effectiveness and the Board's authority are undermined by lack of support from the industry and by trespasses of various agencies, including the Missile Sites Labor Commission.

Job: Petrofka Bridge, Saskatchewan, Canada
Contractor: McNamara Construction Western, Ltd., Edmonton, Alberta

GRIFFIN **Solves Another Dewatering Problem!** The Contractor handling this mid-winter project in the far north—the Petrofka Bridge over the Saskatchewan River—was faced with two major problems: Sub zero temperatures down to—28° below zero; and the need to finish the job before seasonal high floods and river ice descended. A Wellpoint Dewatering system was designed by Griffin, incorporating steam lines, straw and plastic sheets as protection against freezing. Under Griffin supervision the dewatering proceeded with "mid-summer" efficiency as the contractor "open-cut" excavations for two piers in one continuous operation . . . and won the race against the spring thaw. Further proof of the "extra" advantages of Griffin Wellpoint planning, supervision and equipment.

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WASHINGTON OBSERVER

- **Tax-break proposed for plant construction**
- **Corps of Engineers joins race to the Moon**
- **Inquiry into extra Interstate mileage asked**

● **Tax-revision moves continue to build up. The latest one afoot would extend the Administration's tax-credit plan to plant construction, as well as to equipment purchases.** The original White House proposal contained this provision, but the House Ways and Means Committee eliminated it. The final Committee version, never passed by Congress, called for an 8% tax credit on equipment purchases only.

Now Rep. Eugene Keogh (D., N.Y.), an influential member of the Committee, publicly proposes extension of the plan to new buildings. This would permit a company to deduct from the final amount due the federal government as corporate income tax an amount equal to 8% of the cost of the new building. The Treasury will not oppose Representative Keogh's move. Neither will it push it, chiefly because of the additional revenue loss entailed and the difficulty of getting revenue-raisers to offset the $1.1-billion loss from an 8% tax credit on equipment alone.

But outlook for the Keogh proposal—and for the entire tax revision measures, for that matter becomes more questionable. The Administration plan was not received happily by Congress this year, and as of the moment seems unlikely to gain support during next year's election-year session.

—

● **The Army Corps of Engineers has officially assumed its role as construction arm for the nation's space program.** The Corps designated four of its district offices to aid in acquisition of real estate and the design and construction of new facilities for the National Aeronautics and Space Administration. Most of the facilities will be built in support of the Moon-shot Apollo.

Here are the assignments: The Jacksonville District Engineer will be responsible for new design and construction at Cape Canaveral; the Fort Worth District Engineer for the manned spacecraft laboratory near Houston; the Mobile District Engineer for land acquisition and development of a static test facility for Saturn and Nova boosters on the Pearl River in southwest Mississippi; and the Los Angeles District Engineer for design and construction of test stands for F-1 engines at Edwards Air Force Base, Calif.

—

● **A congressional inquiry into a federal highway allocation to West Virginia may be in the making.** Rep. Gordon R. Scherer (R., Ohio) has asked the House Highway-Investigating Subcommittee, of which he is ranking Republican, to make the West Virginia inquiry its first order of business in January. Mr. Scherer charged recently that the Commerce Department's award of 180 additional Interstate highway miles to the state was a "political payoff" (ENR Nov. 2, p. 25). Now, he wants the Blatnik subcommittee to condemn Commerce's action and seek its reversal. Such action is unlikely from a committee controlled by Democrats.

More power–more weight–more tractor!

When you'd rather get the job done by Wednesday afternoon than Friday morning—when you strike heavy gumbo where you'd figured for clay—when you need the extra work capacity of a higher horsepower unit to make out on a bid—that's the place and time to put a "3010" on the job!

All business on one end, simplicity on the other, the self-leveling "3010" Loader is controlled by a single lever for lift arms and bucket. John Deere Backhoes make the most of "3010" power, operate by smooth, rapid two-lever control. Center-mounted and offset models available, digging to 13-1/2 feet—each in a range of bucket sizes.

Machine operators like the clean, open platform of the "3010"—and deluxe, back-supporting seat that adjusts to any man's weight. There's a good view forward, too, with the new, low-profile design.

A 64 engine h.p. gasoline or 69 engine h.p. Diesel unit, the "3010" has power brakes and power steering as standard equipment. Constant-mesh transmission provides eight speeds forward, three reverse.

For a demonstration, contact your dealer through the yellow pages. John Deere, 3300 River Drive, Moline, Ill.

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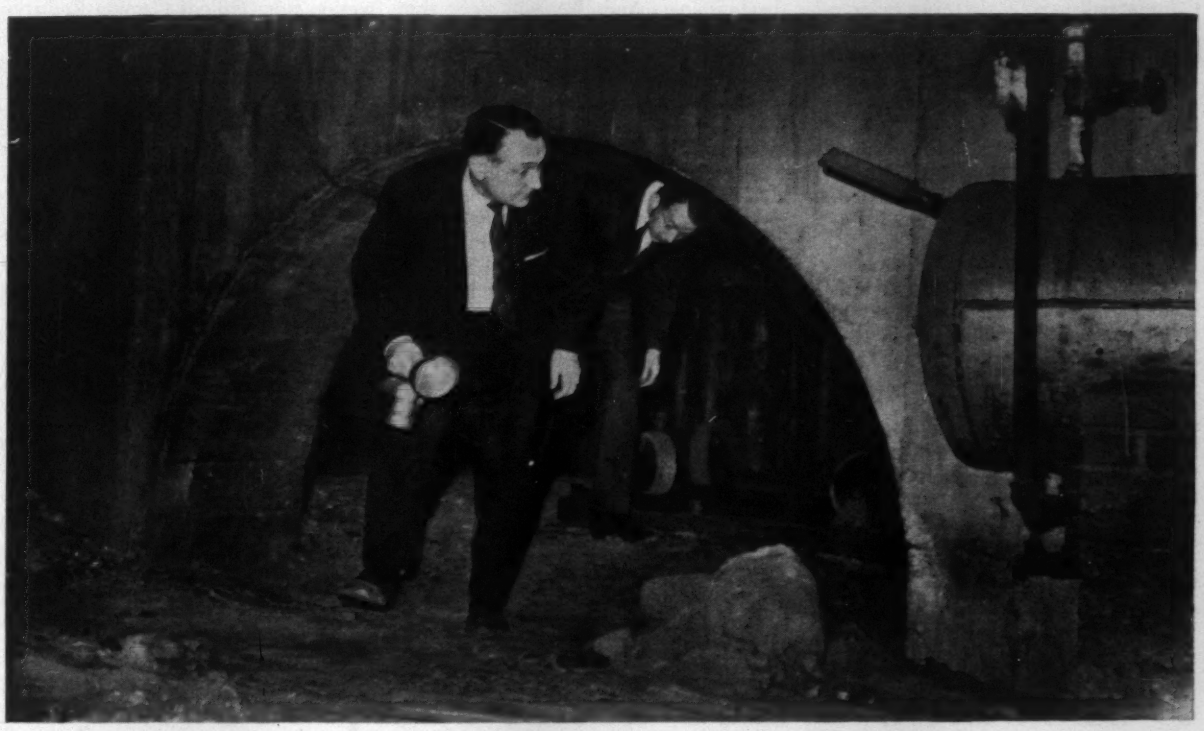


The fallout shelter survey will soon have as many as 1,000 A-E's . . .

Looking for a Place to Hide

As the radioactive dust of the Soviet Union's multi-megaton nuclear air bursts over Siberia settled across the U. S., the Department of Defense made preparations to shelter the public against attack with such bombs. And it selected architectural and engineering firms for a major role.

Men from many of these firms now are taking courses at two service schools and eight colleges to prepare them for this role. They are being trained to implement the $93-million nationwide fall-out-shelter survey (ENR July 27, p. 19, and Aug. 17, p. 28). When they finish, more will follow them.

The schedule calls for contract negotiations to begin at the end of this month or early next month. The Defense Department's new Office of Civil Defense expects to engage from 500 to 1,000 firms to make the survey, which will determine the shelter potential of existing structures in the U. S.

OCD has delegated major contracting responsibility to the Corps of Engineers, which will act through its district offices. The Bureau of Yards and Docks will award contracts and supervise the survey in some areas.

The training is being conducted prior to contract negotiations. It is possible, therefore, that representatives of some firms may qualify and yet not participate in the survey; for example, if satisfactory contracts cannot be negotiated.

OCD plans to award normal architect-engineer, fixed-fee contracts. Fees will be determined by the size of the area the firm will survey.

Architects and engineers who have not yet been invited to take courses or negotiate contracts but wish to participate in the survey should notify their local or state civil defense authorities—not the Defense Department or the schools.

Some survey contracts were awarded some time ago. The former Office of Civil and Defense Mobilization carried out pilot surveys in 20 cities. This was done to gain experience for the official survey—to determine manpower requirements, estimate costs, develop data reporting and evaluation systems.

One significant result is a decision to use a high-speed electronic computer to evaluate the reported data.

OCD has divided the survey into three phases.

- Phase 1, to be completed by next April, will develop data on potential shelters in existing structures in every census tract in the U. S.
- Phase 2, to be finished next July, will yield more detail on those structures the computer selects for conversion into shelters.
- Phase 3, to end in December, 1962, will draw up plans for the conversion.

In Phase 1, the surveyors will draw a base map of the census tract assigned. They will list on the map all structures meeting the minimum criteria: protection factor of 20—capable of reducing radiation to one-twentieth of that outside; 50-person capacity; 10 sq ft per person if properly ventilated or 500 cu ft per person if unventilated. Surveyors will estimate the daytime and nighttime population for each census tract.

Initial sources of data will be tax assessor records, zoning maps, building and fire inspection reports. Listings will be given to local authorities who will arrange with the property owners for use of the spaces as public shelters.

In Phase 2, A-E personnel will visit each structure, determine its dimensions, measure the thickness of walls

and locate and size openings in them. Present plan is to record the data on a standardized form, called Fosdic (Film Optical Sensing Device for Input to Computers).

The Fosdic form will be submitted to the Defense Department contracting officer. He will send it for processing to the Bureau of Census. The data will be transferred to magnetic tape, then fed to one of the National Bureau of Standards computers. The computer will weed out marginal structures, pinpoint those most readily convertible to adequate fallout shelters.

In phase 3, local civil defense authorities will develop a utilization plan for each approved structure that owners will permit to be used for public shelter. Surveyors then will make a more detailed study of these structures and report on a Fosdic form. This time they will analyze also the habitability of each, including ventilation, water supply, sanitation, and emergency food, equipment and medical supply storage. They will also estimate the cost of modifying each structure to increase the protective factor to 100 or more and improve habitability at least to minimum standards.

Also, the surveyors will mark the boundaries of the approved shelter spaces. Later, local civil defense authorities will place signs on the outside of the buildings. And they will stock the shelters from central federal inventories. Provisions will include 108,000 calories of food per person, 3.5 gal of water per person, medical and engineering supplies, radiation measuring instruments, radios and chemical toilets.

The Phase 2 data also will be analyzed by computer, which will select shelters for Phase 3. Modification plans and refined cost estimates will be drawn up for these shelters.

For this work, OCD expects to train up to 3,000 men, including government personnel, by the end of next June. It has scheduled a total of 86 courses. These are being given at Ft. Belvoir, Va.; the Navy's Civil Engineering Officers School, Port Hueneme, Calif.; Worcester Polytechnic Institute; University of Michigan; University of Illinois; Oklahoma State University; University of Florida; University of Washington (Seattle); University of California (Berkeley) and University of Colorado.

Students rely principally on two texts: Fallout Shelter Surveys: Guide for Architects and Engineers (NP-10-2 National Plan Appendix Series), and Design and Review of Structures for Protection from Fallout Gamma Radiation—both prepared by the old Office of Civil and Defense Mobilization.

Civil defense experts conduct the course in formal academic style. They give examinations at the end of the two-week course. On the average, about 8% of the students fail. So far, about 600 military engineers, who will serve as contracting officers, and private architects and engineers have successfully completed the course and have been certified as qualified for shelter survey work.

A prerequisite for the course is an engineering or architectural degree or the equivalent and a thorough working knowledge of algebra, trigonometry and the slide rule.

The instruction program totals 80 hours. About eight hours are assigned to analysis of nuclear weapons effects, 28 hours to radiation shielding, 36 hours to general protective considerations—shelter evaluation, environmental engineering, case studies—and eight hours to summations and examinations.

Defective Piles Halt Airport Work

Construction of the $32-million passenger terminal at New York City's La Guardia Airport has been stopped because of the discovery of defective cast-in-place foundation piles installed by Raymond Concrete Pile Co. under a $1-million contract.

According to spokesmen for the Port of New York Authority (PNYA), owner of the airport, no further work will be done until every one of the more than 1,500 piles driven to support the main part of the structure has been tested and all defects have been corrected. By the end of last week tests on 300 piles had revealed 15 defective ones.

Two types of defects have been found—voids in the concrete within the piles and segregation of the materials within the concrete. In one case, 31 ft of a pile was found to contain no concrete. In another case, 21 ft of pile was without concrete.

The areas of segregated materials so far discovered range in depth from a few inches to 10 ft. In most cases the defects start 3 to 6 ft below the cut-off elevation but in all cases—even where there are voids—there is sound concrete both above and below the defective areas.

According to John M. Kyle, Chief Engineer for the Port Authority, neither the Authority nor the pile contractor, is prepared at this time to explain the condition. This remained the case as ENR went to press.

The piles, which are 100 to 130 ft long, are of a composite type consisting of a bottom section of 10¾-in. OD, ¾-in. wall pipe and a top section of 12-in.-dia, 16-ga spiral shell. The top sections vary in length from 30 to 50 ft and they are connected to the bottom sections by plow rings.

The piles were driven through an 18-ft upper layer of miscellaneous fill—mainly cinders—a 10 to 12-ft secondary stratum of meadow mat, a 70 to 80-ft stratum of muck overlying boulder-strewn granular material in which the bases of the piles rest. The water table in the area is about at grade—El. 5.0.

The piles, which are of the friction type, were driven in accordance with the Engineering News Formula to sustain 50 tons and about 10 of them tested successfully carried 100-ton loads.

To prevent the build-up of artificial friction through drag-down, the Port Authority required Raymond to install an 18-ft-long, 16-in.-dia pipe at each pile location, to clean the pipe, and to drive the permanent pile within it. The outer shell was then removed for reuse.

Every pile was inspected immediately after it was driven and as a result of this inspection, 110 piles were rejected—mainly because they exceeded the allowable deviation from vertical alignment. All accepted piles were again inspected before being concreted. All wet piles were bailed with a ball-valved bucket.

The first defect was discovered in mid-October when workmen, cutting off a pile that had been filled above cut-off elevation, found a void. The Port Authority immediately ordered sonic tests on all piles. When physical inspection showed a poor correlation between actual pile conditions and the indications of the sonic tests, these tests were abandoned. Next an attempt was made to hole the concrete in the piles with wagon drills. This didn't work either because the drills came out the side of the piles.

The PNYA then tried jack hammers and has since had from 4 to 10 of the machines working every day. Holes are drilled in each pile to a depth of 15 ft. At the first sign of a deficiency, hand drilling is stopped and one of six coring rigs on the job makes a 4-in. hole. Each of the hand drills averages about 10 holes per day—the coring rigs get one per day.

Up to the present time the Port Authority has borne the cost of the testing, but Mr. Kyle admits that the final allocation of all costs—including those for testing, remedial measures and delays, will depend on the results of the tests and the remedial measures required.

Business Raises Spending Plans

Manufacturing companies' plans to boost their capital investment spending by 7% next year bolster ENR's forecast that industrial building contracts in 1962 will rise 22% above 1961 (ENR Sept. 7, p. 19).

The spending boost of 7% by manufacturers appears in McGraw-Hill's report on plant and equipment investment planned for 1962 by industry. It shows that all U.S. business plans a 4% increase in capital investment next year.

Business reported in October that it expected to spend $35.8 billion next year compared to an estimated $34.5 billion this year (see table). Manufacturing companies, which account for about 40% of all capital investment, plan 1962 spending of $14.6 billion, compared with an estimated $13.7 billion this year.

Previous experience indicates that these preliminary plans will be revised upward when companies complete final budgets. In the fall of 1954, when the economy was recovering from an earlier recession, business reported it planned on spending 5% less on new plant and equipment in 1955 than it spent during 1954.

But in the spring of 1955, business revised its plans and reported outlays would rise 5% over 1954. Actual expenditures for 1955, however, exceeded 1954 by 7%. And in the fall of 1958, preliminary plans for 1959 called for an increase over 1958 of only 0.5%, but actual outlays topped 1958 by 7%.

Within manufacturing, the 7% increase planned for 1962 also rates as a candidate for a revision upward. At the end of October, ENR reported the volume of proposed industrial work stood at $3.2 billion, 9% above the same period of 1960.

All major industries except electrical machinery and chemicals plan to increase their investment next year. The durable goods producers plan a slightly greater boost than the soft goods manufacturers.

Steel producers plan a 15% increase in their 1962 investment, despite the considerable excess capacity this industry now possesses. The continued high level of investment by steel points to its concern with updating obsolete plant and installing additional cost-cutting equipment.

The nonferrous metal industry, which cut investment this year, now plans a 7% increase next year.

The highest percentage increase planned by any major industry promises to come in fabricated metals instruments, the latter group of producers clearly the ones benefiting from continued automation of production. They obviously plan gearing their investment toward this growth in automation.

Machinery manufacturers plan to spend 6% more on new facilities next year, with office machinery leading. The electrical machinery industry, however, plans an investment reduction of 9%. Despite this cut, outlays by this industry will be the second highest year on record.

The automotive industry, although possessing adequate capacity, plans to spend 3% more next year. Transportation equipment manufacturers—largely aircraft and missiles producers—expect a 7% boost, undoubtedly spurred by some additional Department of Defense orders.

Although the durable goods industries as a group plan greater increases in capital spending next year, the nondurable goods producers are not far behind.

Food and beverage companies plan spending of more than $1 billion next year, the first time this industry will hit the billion-dollar level. This would put the food industry in the same big league with chemicals, steel, and machinery.

Petroleum plans a 10% increase in investment next year, a boost that would bring total outlays in 1962 to more than $3 billion. This would be a level achieved only in 1956-57.

Greatest increases will occur in refining and petrochemicals, but production and marketing facilities will also be expanded.

The chemical industry, which since 1951 spent well over $1 billion a year, plans a slight decrease of 2% in investment next year.

The paper and pulp industry plans to lift its investment by 6%. Rubber companies also anticipate boosting their outlays by 8%.

In the non-manufacturing industries, some of which rate as the biggest source of business for engineers and contractors, spending plans also indicate increased spending.

Electric and gas utilities, and commercial companies, two major buyers of building services, will maintain their rising pattern of spending. The utilities group plans a 2% increase in outlays, which would bring 1962 spending to $5.9 billion.

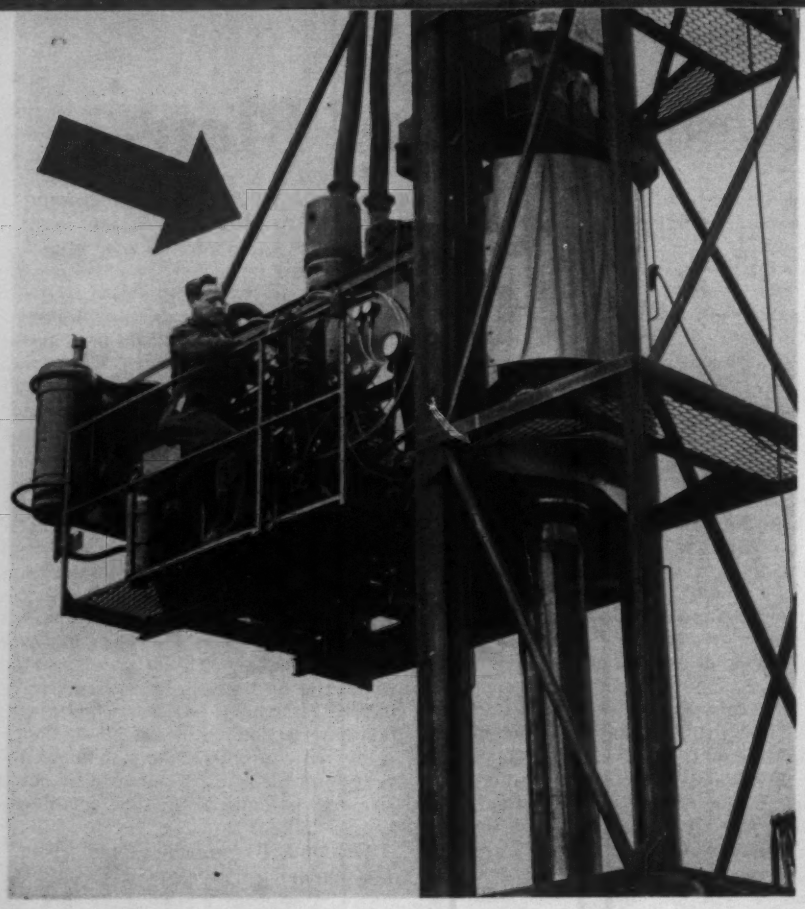
Commercial companies—large chain, mail order and department stores, insurance companies and banks—plan outlays of $8.72 billion, a 4% rise over this year.

Industry's Capital Spending Plans for '62

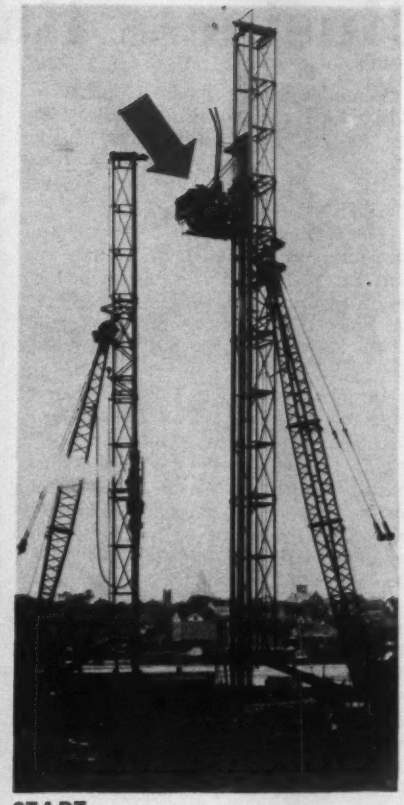
(billions of dollars)

	1960 Actual*	1961 Estimated†	1962 Planned†	1961–1962 % Change	1963 Planned†
ALL MANUFACTURING	$14.48	$13.69	$14.59	+7	$14.19
Iron and Steel	1.60	1.16	1.33	+15	1.21
Nonferrous Metals	.31	.26	.28	+7	.35
Machinery	1.10	1.10	1.17	+6	1.17
Electrical Machinery	.68	.68	.62	−9	.63
Autos, Trucks & Parts	.89	.68	.70	+3	.74
Transportation Equipment (Aircraft, Ships, R. R. Equipt.)	.42	.39	.42	+7	.36
Fabricated Metals & Instruments	.95	.90	1.06	+18	.99
Chemicals	1.60	1.65	1.62	−2	1.57
Paper and Pulp	.75	.72	.76	+6	.77
Rubber	.23	.22	.24	+11	.26
Stone, Clay and Glass	.62	.49	.53	+8	.53
Petroleum & Coal Products	2.64	2.78	3.06	+10	2.94
Food and Beverages	.92	.98	1.04	+6	.93
Textiles	.53	.51	.56	+10	.53
Miscellaneous Manufacturing	1.24	1.17	1.20	+3	1.21
NONMANUFACTURING					
Mining	.99	.99	.99	0	.94
Railroads	1.03	.63	.64	+1	.70
Other Transportation & Communications	5.07	5.02	5.03	0	4.84
Electric and Gas Utilities	5.68	5.75	5.87	+2	5.97
Commercial (1)	8.44	8.38	8.72	+4	7.85
ALL BUSINESS	35.69	34.46	35.84	+4	34.49

** U. S. Department of Commerce, Securities and Exchange Commission, McGraw-Hill Department of Economics.*
† McGraw-Hill Department of Economics.
(1) Figure based on large chain, mail order and department stores, insurance companies, banks and other commercial businesses.



BODINE SONIC PILE DRIVER . . .
This unit competed with a conventional single-acting pile hammer.



START . . .
Hammer (left) is at 36 ft, Bodine at 75 ft.

'Sonics' Drive a Pile 71 Ft,

Construction men who've seen or heard of it are mulling over the astonishing performance of C. L. Guild's sonic pile driver. Is it just another pile driver? Is it a panacea? Or is it something in between?

The first practical American-made vibratory pile driver made its debut in Providence, R.I. (ENR Nov 2, p. 17) and the results of its coming-out party were highly impressive even to seasoned construction men.

Particularly impressive was the staging—the vibratory unit was pitted against a single acting steam hammer of a conventional type. The steam hammer sank a pile 67 ft in 90 minutes. The vibratory unit, working 15 ft away, sank a similar pile 71 ft in 42 seconds.

In one stage of the testing the vibratory unit put its pile down 70 ft while the steam hammer was moving its pile about three inches (see photos above).

At another stage, the vibratory unit installed and extracted a 75-ft pile seven times while the steam hammer drove its pile only 12 ft into the ground.

The vibratory machine demonstrated in Providence is called the Bodine Sonic Pile Driver. It was invented by Albert G. Bodine, Jr. of Van Nuys, Calif., whose patent No. 2,975,846 describes an "acoustic method and apparatus for driving piles." The machine was brought to its present state of development by C. L. Guild Construction Co., Inc. of Providence, in conjunction with Mr. Bodine.

In principle the Bodine machine is similar to Russian and German vibratory pile drivers, which have been in limited use in Europe and Asia since the early 1930s (ENR July 16, 1959 p. 53) and to a French machine developed in the last five years.

Basically, each of the units consists of a power plant, which, through drive shafts and gears, turns a series of horizontal shafts bearing eccentric weights. These shafts are geared so that alternate ones revolve in opposite directions. The eccentricity of the loads is such that the resultant thrust for all the shafts during rotation is either up or down. Because of the counter-rotation the lateral thrusts are cancelled, but because of the relative position of the weights the vertical components of thrust are additive.

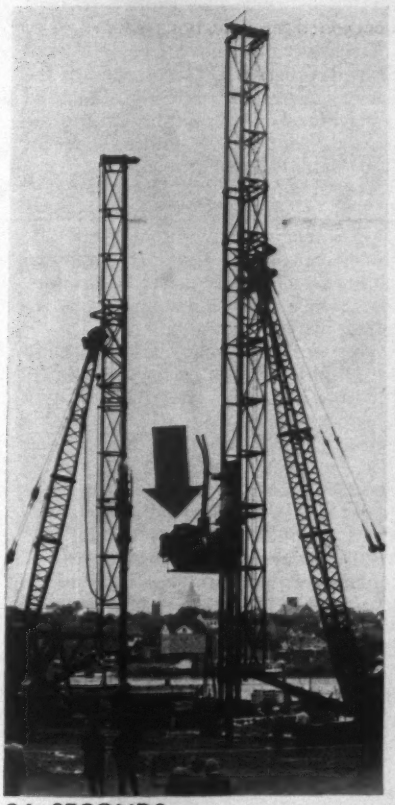
However, in spite of the similarity of mechanical operation, Guild claims the Bodine machine to be a new—and superior—unit in that it works within the sonic range at frequencies up to and over 100 cycles per second as opposed to frequencies ranging from 15 to 22 cycles for the earlier machines.

The increased frequency makes it possible, according to Guild, to install a pile by resonating it at its natural frequency rather than by "thumping" it in under a series of rapid but sub-sonic impacts.

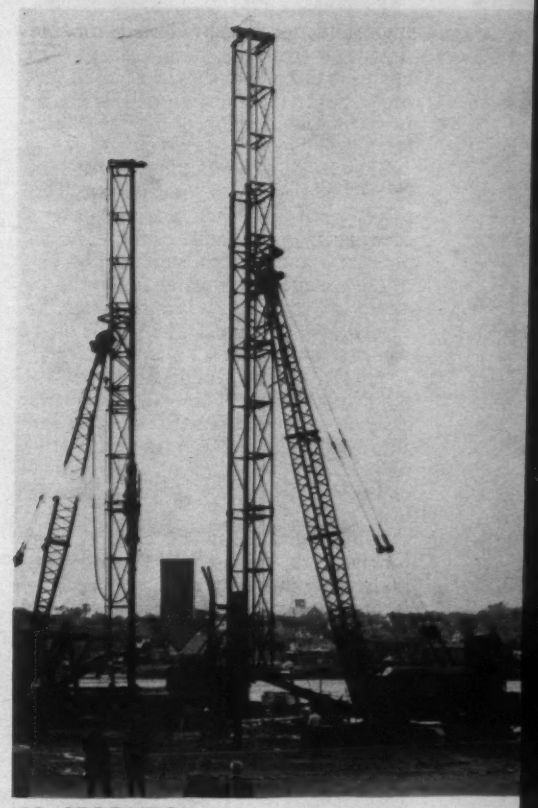
Among other things, the resonating of the pile, permits efficient transfer of driving energy to the base of the pile where it is needed most and it forces the weight of the pile to assist in the driving.

In a conventional hammer, much of the impact of the ram is dissipated through necessary cushion blocks or driving heads or both, by the inertia of the pile itself and by skin friction that might possibly develop between the relatively widely spaced blows.

18 SECONDS . . .
Bodine has driven pile 23 ft.



36 SECONDS . . .
Sonic pile is in 55 ft.



42 SECONDS . . .
Home at 71 ft. Other pile has moved 3 in.

While Steam Drives Another 3 In.

One of the other advantages claimed for the Bodine driver is that its sonic vibrations set up a wave pattern within the pile that brings into play an application of Poisson's Ratio (relating the unit strain in one direction to that in a perpendicular direction) and takes advantage of the fact that as an elastic member is expanded in one direction it is contracted in another.

This being the case, a pile installed with a Bodine driver theoretically would vary in cross sectional area during its installation, with the smallest area existing at the instant of penetration and the greatest area existing at the instant of rest. Thus the expanded pile at rest makes a larger opening in the soil than is required by the contracted pile in motion, so skin friction during driving is reduced to a bare minimum.

The piles driven by Guild at its test demonstration were 12¾-OD, ¼-in. wall steel cylinders capped at the bottom end by a flat steel plate. The one installed by the single acting steam hammer was 70 ft long, the one installed by the sonic driver, 75 ft long. The soil through which the piles were driven is mainly wet, fine to coarse sand with some gravel and traces of silt. In fairness to the conventional hammer, it must be admitted that this material is described by Gregory T. Tschebotarioff, world renowned authority on soil mechanics, as particularly well suited to vibratory methods of pile installation (ENR July 16, 1959, p.53). Conversely, it is regarded by pile men as presenting an extremely difficult driving condition for a conventional hammer—particularly for piles having a flat-plate bottom and installed without the aid of a water jet.

Cohesive materials, such as heavy clays, are supposedly the least desirable materials for vibro-installed piles, but Guild reports successful installations of cylindrical piles in the clayey soils of Boston. This success in coping with clays is reported shared to some degree by the Russian vibratory drivers and to a lesser degree by the German machines, although the latter units work in granular soils at rates commensurate with those of Guild's "sonic" rig.

The September 1960 issue of the Swiss publication FACHBLATTER FUR DAS BAUWESEN reports that in the enlargement of the Berne railway station a German vibratory driver first installed, then extracted, 44-ft, wide flange soldier beams in as little as 20 seconds.

Yet, in spite of this rapid-fire installation of individual piles, the average number of piles installed on the Berne job was between 30 and 40 per seven-hour shift. Pile driving operations other than the actual pushing of the pile into the ground consumed the greater part of the working day.

Furthermore, to be effective, the Bodine driver must be firmly attached to the pile it is driving. The test pile used in Providence had a flanged top and was held to the driver by 20 bolts. When shell piles are to be driven with a mandrel the initial attachment of the mandrel to the pile driver will not pose too great a problem. For piles of any type driven without a mandrel, the attachment by welding flanges and bolting could well take more time than driving with a conventional hammer.

(*Please turn the page*)

However, Guild reports that he has built and successfully tested for the driving of steel pipe piles a clamp that connects the pile to the driver in 20 seconds. Some modification of this clamp is yet to be developed for other pile sections.

The size of the Bodine driver is a factor that could well limit its use. The power plant shown on Bodine's patent drawing is a hydraulic turbine incorporated as an integral part of a cylindrically shaped driver and run by fluid pumped through hoses from a reservoir carried on a crane. The result is a compact unit.

As set up by Guild, however, the power plant is a 500-hp Sherman tank gasoline engine mounted on a frame ahead of the driver. As a result, the unit is 3½ ft wide, 8 ft high, and it extends 7½ ft ahead of the pile-driving leads.

Thus, while the unit is cited as ideal for city work, because it is almost silent, even when installing piles, and because it creates almost no vibration in the surrounding soil, the present model can't very well be used in cities where piles often have to be installed within inches of existing walls.

Guild readily admits the need for improvements on the prototype, is working on them and expects to have the desired modifications soon.

Two other problems are being worked on—getting general acceptance of the Bodine driver; and devising a method or machine for determining, during the driving operation, the bearing value of a pile installed with the Bodine.

These are separate problems, but they are closely related. The unfamiliarity of U.S. engineers with vibratory pile driving calls for a major promotional job, and such a job is handicapped by the absence of a simple way of establishing pile bearing value.

For steel sheetpiles, soldier beams or end bearing piles driven to rock the question is more or less academic. For piles designed to support loads by skin friction, end bearing on strata above rock, or both, determining bearing value is imperative. At this time it is necessary to determine the approximate length of piles needed by driving tests with a conventional hammer in accordance with a formula. Then to determine the value of a pile installed with the Bodine driver it is necessary to test each pile with a conventional hammer or to make load tests. If the Bodine driver is to be practical for all types of pile installation, this must be changed.

Houston Takes to the Air

Dedication of the site of Houston's proposed Intercontinental Airport last week was the highlight of the city's "Operation Aerospace," a week devoted to aviation-space technology.

The $84-million airport will feature a doughnut-shaped terminal with seven boarding fingers, three runways and a central tower for concessions and control. It will be on a 6,000-acre site 15 miles north of the central business district (ENR July 20, p. 35).

Construction is scheduled in two stages. The $55.3-million first phase, to be completed by 1966, will consist of two runways and a terminal building. The second phase, costing $28.7 million, calls for construction of the third runway and expansion of the terminal building and other facilities by 1975.

The master plan for the airport, which was recently approved by the Houston City Council, was prepared by three Houston consulting engineer firms, Lockwood, Andrews & Newnam; H. E. Bovay, Jr. and Associates; and Turner & Collie.

"Operation Aerospace", sponsored by the City of Houston and the Chamber of Commerce, was designed to create community awareness of commercial, general and military aviation and space technology in the Houston-Gulf Coast area. Houston, it was announced, will be the site of NASA's $64-million space research laboratory.

Falling Ceilings

Several lath tie failures spur ceiling studies

The Corps of Engineers is investigating recent failures of metal-lath and gypsum-plaster suspended ceilings in Army hospitals and classroom buildings.

In all cases, failure or hazardous conditions threatening failure have occurred as a result of corrosion of galvanized tie wires. The ties secure metal lath to furring channels and these furring channels, in turn, to runner channels.

The most serious corrosion occurs in the lathing tie wires where they are embedded in the gypsum plaster and in the furring tie wires where they come in contact with the plaster. In a nationwide survey of Army buildings by division and district offices of the Corps, the galvanized tie wires showed no signs of corrosion where the wires were not in contact with the gypsum plaster.

Failure of ceilings last July in a hospital under construction at Fort Lee, Va., alerted the Corps to the danger. Since then, serious corrosion of tie wires has been found in every area of the country, except the San Francisco and New England divisions. The Fort Lee ceilings failed within six months of plastering, but another ceiling in a classroom at Fort Belvoir, Va., had been in place more than 10 years before it failed.

Close to Washington, the Engineers found evidence of serious corrosion in a new hospital at Fort Eustis, Va., in tie wires that had been in place only three or four months. Suspect conditions also were uncovered in new hospitals at Fort Meade and Andrews Air Force Base in nearby Maryland.

Cause of the corrosion has not yet been definitely determined. Chemical analysis of the base coat of gypsum plaster in the Fort Lee Hospital showed a high percentage of chlorine, but whether sodium chloride or calcium chloride was not determined.

Jack Fisher, managing director, Metal Lath Association, attributes the corrosion to highly humid conditions in the plenums above the plaster ceilings. Venting the plenums, to remove the moisture, would easily rectify the condition, he says.

To prevent tie-wire corrosion in new construction, the Corps changed its specification to require stainless steel wire of nonmagnetic type.

Army Engineers warn that casual inspection may not reveal the extent of the corrosion, only rust stains at the surface of the plaster, while within the plaster the wires may be completely corroded. The office of the Chief of Engineers had to send diagrammatic instructions to the field offices to assure the thorough examination needed.

Consultants Urged to Hire Defense Against Claims

Consulting engineers will find themselves behind a legal eight ball if their organization fails to hire an outstanding law firm to provide defense against the onslaught of unjustified claims against engineers.

This warning came from John Williams, Washington, D. C. consulting engineer, who spoke last week at the Consulting Engineers Council convention at Miami Beach.

Withdrawal by insurance companies from the business of writing professional liability insurance policies, concurrent with the rising number of claims against engineers calls for some means of reversing the unfavorable trend of court decisions, says Mr. Williams.

Mr. Williams says that hiring a top-flight legal firm by CEC would:

- Provide research on precedents.
- Lend assistance to CEC in lobbying for more favorable local and national legislation.
- Provide continuing review of contract documents.
- Notify claimants that a charge against a member would constitute a case against the entire Council.

Mr. Williams predicted that vigorous defense of claims against members would reduce number of lawsuits and ultimately lower insurance premiums. It also would be more proof of the organization's worth and bring in new members, he noted.

Such a move would not replace professional insurance programs or lawyers retained by individual members.

One positive achievement of Miami Beach meeting was the adoption of a standardized indexing system for mechanical and electrical special conditions for use with American Institute of Architects general conditions.

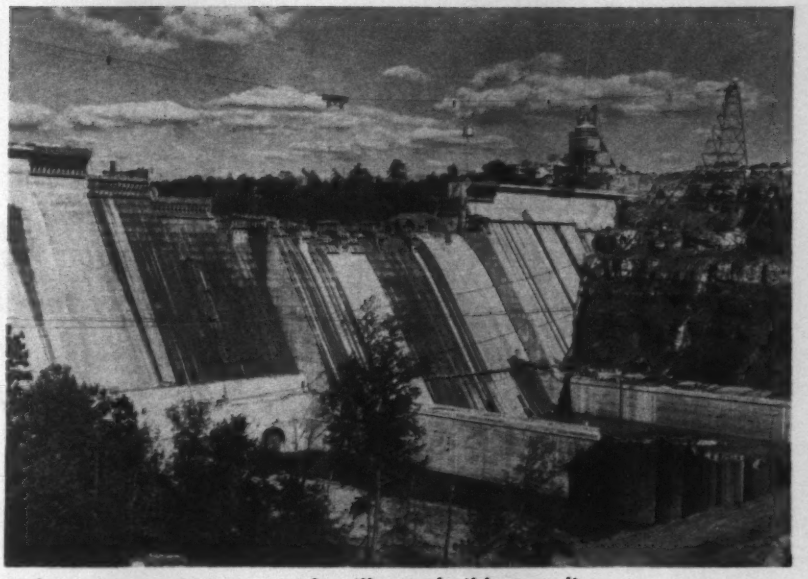
James D. Marshall Dies; AGC's Executive Director

James D. Marshall, executive director of the Associated General Contractors of America, died last week at the age of 74 in Washington, D. C.

The week before he died, Mr. Marshall was in New Orleans for AGC's mid-year board meeting.

James Marshall led AGC since 1953, and his association with the organization went back to 1925, when he started as manager of its branch in Minnesota.

In 1934, he joined the headquarters staff in Washington as manager of AGC's heavy construction division. Three years later he established its Labor Relations Department. He served on the President's Missile Sites Labor Commission since last May.



With concrete nearing top of spillway, builder predicts . . .

Early Finish at Greers Ferry

With 98% of the concreting finished, Greers Ferry Dam on the little Red River in Arkansas is running nearly 10 months ahead of schedule.

Credit for the fast finish, says the Corps of Engineers, goes to good weather and good management by Morrison-Knudsen Co., Inc., sponsors of the joint-venture group building the dam. There's no bonus for early finish in the $17.6-million contract. Other partners in the venture, known as Red River Builders, are Henry J. Kaiser Co. and Johnson, Drake & Piper, Inc.

Greers Ferry is the fifth of nine dams authorized to control the White River and its tributaries. It's a 253-ft-high, concrete gravity-type dam, 1,704 ft long at the crest. Two 18½-ft-dia penstocks lead to a future 96,000-kw powerhouse to be built by Paul Hardeman, Inc.

Project manager for most of the work was Phil Soukup, now transferred to Yellowtail Dam in Montana as project manager. Lee True is present project manager. L. F. Sherman is resident engineer for the Little Rock District of the Corps of Engineers.

Homestake Start Set for January

Target date for bids on the $40-million Homestake water diversion project is January 2. The project was made possible when the Colorado Supreme Court overturned a decision by the Eagle County District Court barring eastern slope cities from siphoning Eagle River water over the Continental Divide (ENR Nov. 2, p. 17).

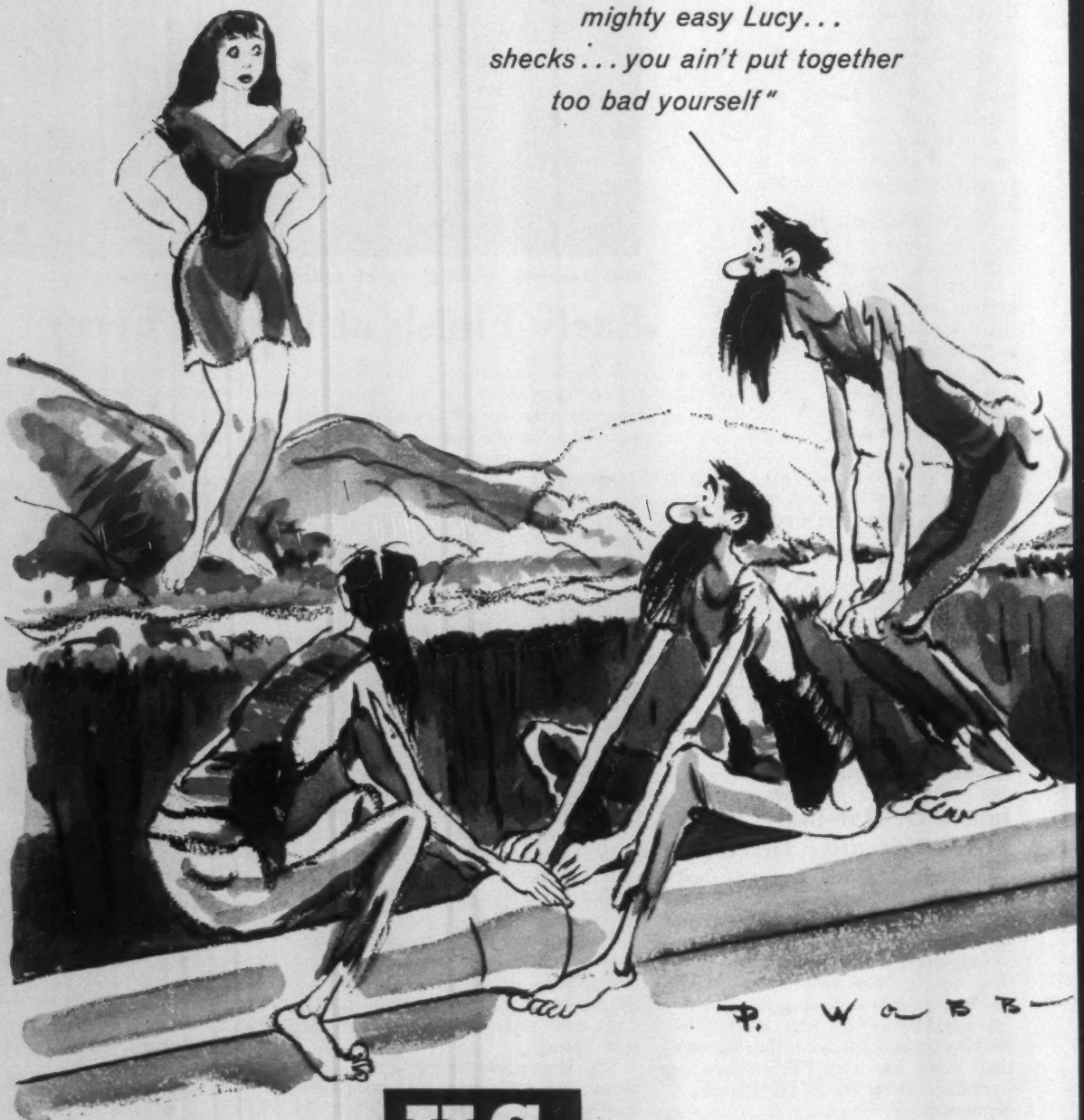
The Supreme Court has refused petitions to rehear its decree and will now undoubtedly direct the District Court to issue a water rights decree to eastern slope cities, Denver, Aurora and Colorado Springs.

The Homestake project is the larger of two projects given the green light by the decision. It is the brainchild of John P. Elliott, a Denver consulting engineer who discovered that the Eagle River was the last major source of water in Colorado that did not have all its water allocated by pioneer decrees.

Mr. Elliott's plan is to divert 75,000 acre-ft of water from several tributaries of the Eagle River through a 5.3-mile tunnel to a tributary to the Arkansas River. Farther downstream it will be picked up and carried through pipelines over Trout Creek Pass into streams that will take the water to Colorado Springs and Denver.

The water will be divided three ways, a third going to Colorado Springs, a third going to Aurora, and the rest going to the Metropolitan Water Users Association, a non-profit group sponsored by Mr. Elliott to deliver the water to Denver suburbs. Boettcher & Co., Denver investment bankers handle financing.

The second project—but one that Mr. Elliott thinks should be incorporated with his Homestake Tunnel project—is the City of Denver's $17-million Blue River diversion plan. The Denver Water Board plans to tap some other tributaries of the Eagle River plus part of the river itself and pass the water over the Continental Divide.



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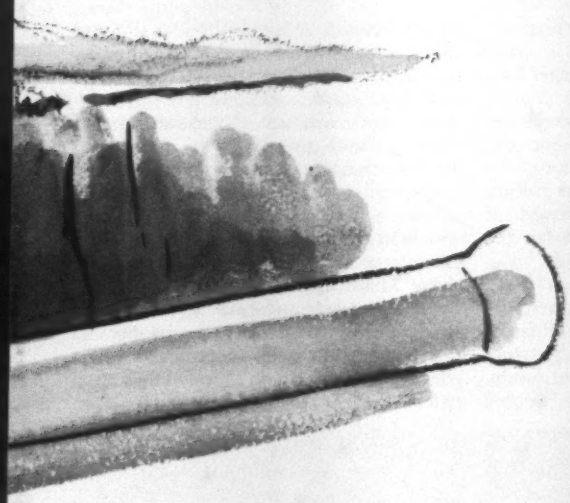

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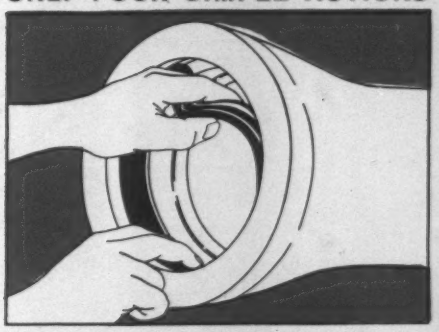
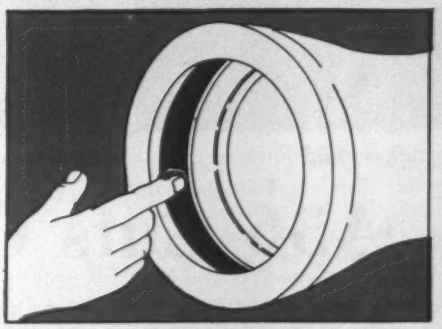
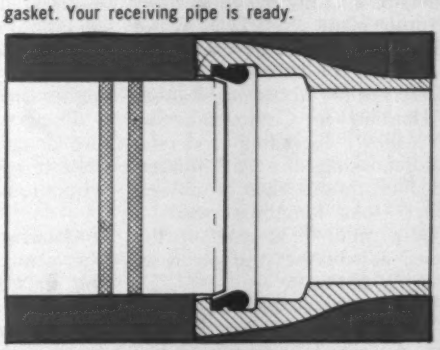


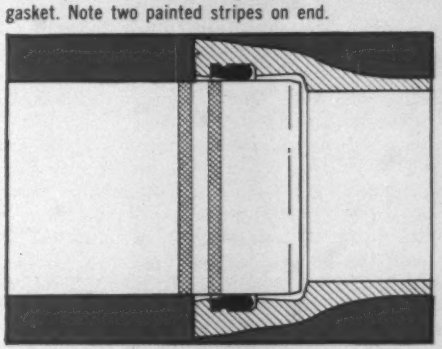
Insert gasket with groove over bead in gasket seat . . . a simple hand operation.



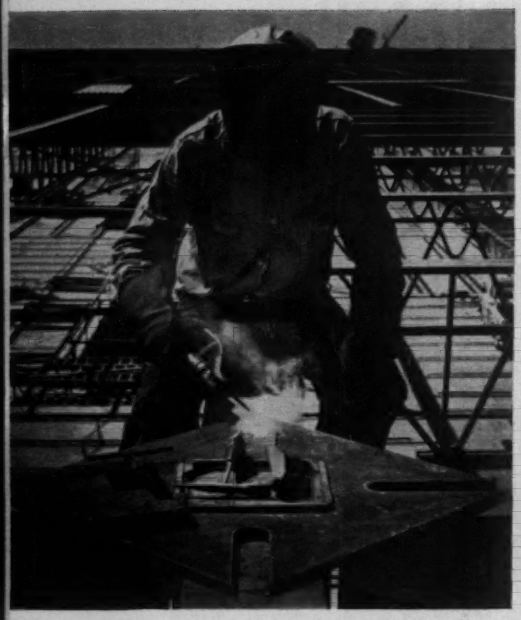
Wipe film of Tyton Joint® lubricant over inside of gasket. Your receiving pipe is ready.



Insert plain end of entering pipe until it touches gasket. Note two painted stripes on end.



Push entering pipe until the first painted stripe disappears and the second stripe is approximately flush with bell face. The joint is sealed . . . bottle-tight, permanently! The job's done . . . . fast, efficiently, economically. Could anything be simpler?



Welder makes rigid joint so . . .

Girders, spanning 50 ft in a California factory, are continuous.

A36 Cuts Cost and Weight 10%

By Harold C. Smith

Designers of a California rubber tire manufacturing plant saved 10% in the cost and weight of steel by using A36 steel.

The factory is for Armstrong Rubber Co. at Hanford in California's San Joaquin Valley. Including concrete-framed warehousing, the $6.3 million structure totals more than a million square feet (total length is nearly a quarter of a mile). The cost of the steel-framed part of the structure is estimated at 90¢ per sq ft.

Designers started to plan the plant with A7 steel in mind. But, a short time later A36 steel became available. The structural engineers saw possibilities in the new steel for appreciable savings, so they revised the design.

• **Advantages of A36**—Their figures show a reduction in both cost and weight of nearly 10% as compared with the original A7 design. With A36 the structural engineers got a 10% increase in working stresses over those allowed for A7—the basic allowable stress in bending and tension is 22,000 psi (minimum yield point, 36,000 psi). In addition, the steel has improved chemical properties that are particularly important in an all-welded structure:

• Carbon content is held to a maximum of 0.28% (A7 specification sets no limit on carbon.)

• Manganese and silicon levels are consistent with good welding and the higher strength of this steel.

Using these properties to the fullest, the designers reduced the weight of steel to more than compensate for the $1-per-ton higher base price.

• **Manufacturing factor**—Designers of the plant also provided flexibility of use in the 240,000-sq-ft, single-story manufacturing area of the plant by incorporating a moment-resisting, welded frame with 50-ft bays.

Working with the architect-engineer team, the owner determined that 50-ft bays in two directions would provide the best compromise between minimum cost of building construction and clear floor area required for process and manufacturing equipment. Furthermore, the need for unobstructed floor areas prevented use of interior walls or bracing. So, the designers provided a two-way moment-resisting frame for lateral loads with hollow-box columns on 50-ft centers.

Two considerations weighed heavily in the decision to use box columns. Such columns have equal strength about each axis—important in a two-way rigid frame. Also, they meet the client's requirement that column flanges be protected against fork-lift truck impact. Box columns do not need the concrete encasement usually provided for such protection, so occupy less floor space. Accordingly, the columns are made up of welded pairs of 9-in. channels and plates.

Roof joists alternate in direction in adjacent bays. Thus, girders in each direction carry the same loading and in typical interior bays, they are the same size (18 WF 55) and length and have identical end connections.

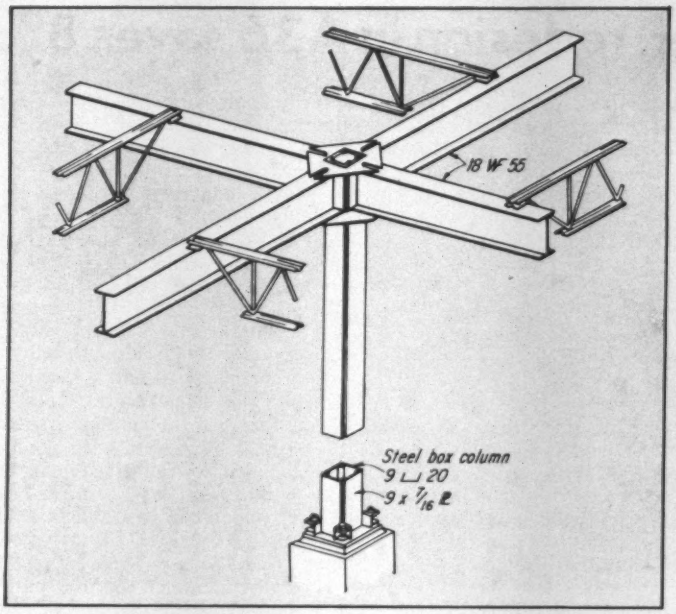
A welded connection at the top of each column provides continuity in each direction. This connection was detailed so that no shop fabrication was required on the girders. However, the fabricator, Kaiser Steel Corp., elected to punch two holes in the bottom flange at each end for erection purposes.

Girder seat and cap plate details permit downhand field welding.

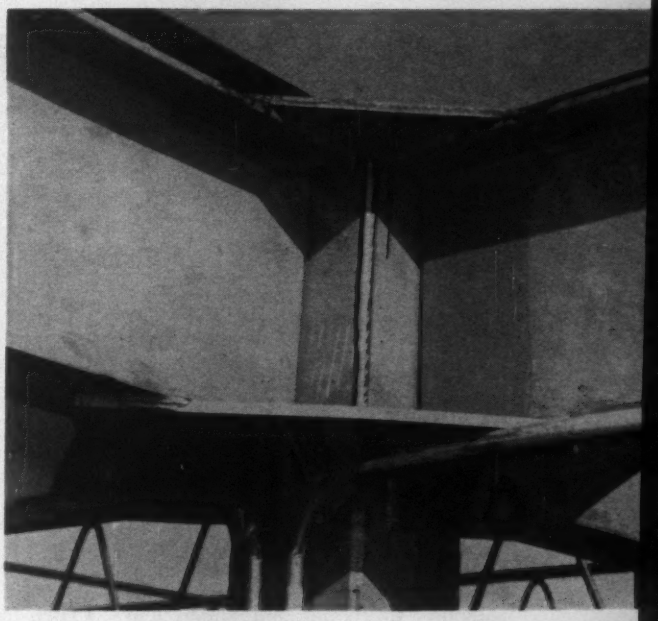
• **Facts of framing**—The framing system chosen is rigid, yet lightweight. Structural steel weight, including columns, averages 3.1 lb per sq ft in a typical bay.

Designers saved additional weight by using open-web, high-strength joists with cold-rolled chords. Such joists average 2.5 lb per sq ft including bridging and accessories, compared with 3.1 lb per sq ft for similar joists with hot-rolled sections. The cold-rolled steel used in the joists has a minimum yield point of 47,000 psi and a basic working

***Harold C. Smith** is regional engineer for the American Institute of Steel Construction, responsible for a wide area of the West Coast, including northern California.*



Rigid frames of A36 steel carry open-web joists.



Column-girder connection is welded.

on One-Story Factory

unit stress of 28,500 psi in tension.

The 800-ft-long, steel-framed factory stands between two concrete warehouses. Separations were required for possible seismic action. Also, intermediate temperature-control joints were necessary in a building of this length. Consequently a 2-in. separation was provided at each end of the factory. Sheet metal slip joints provide weather protection. The shop and personnel facilities wing extending from one side of the factory building offered logical locations for the transverse temperature-control joints, which extend the 300-ft width of the building. The owner preferred to avoid a double-column system; so the engineers detailed a friction joint comprising the typical box column and a cantilevered bracket.

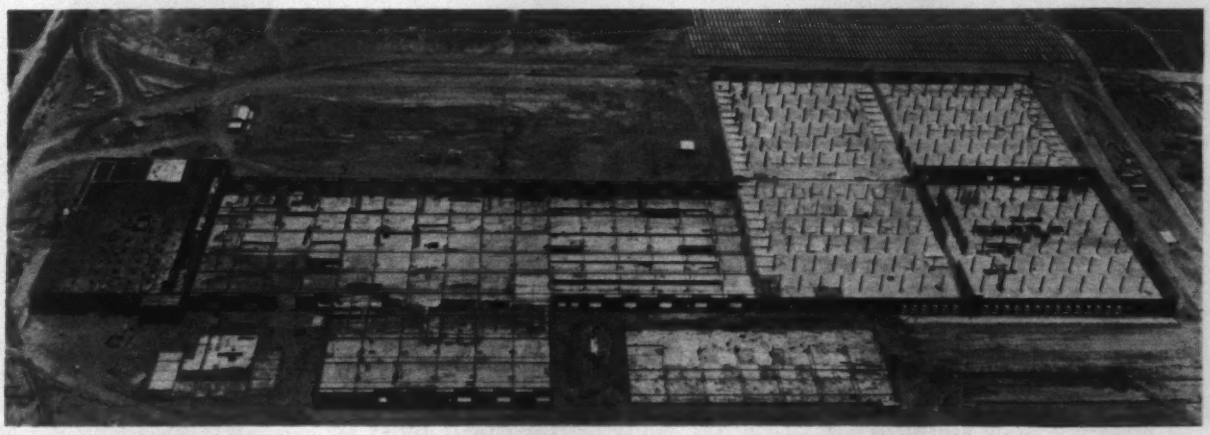
• **Concrete outside**—Exterior walls for the factory building are 6-in.-thick, precast concrete panels. Five-eighth-in. bolts c-c vertically fasten them to steel columns 4 ft. Adjacent panels are separated by a 2-in. joint covered with an aluminum channel. Panel bases are secured to the floor with No. 3 dowels on 18-in. centers.

The finished-goods warehouse also has precast concrete walls, but with cast-in-place concrete frame and precast roof panels. The raw-materials warehouse, however, is a conventional flat-slab building with cast-in-place walls. In addition to being built of entirely incombustible materials, the plant will have an automatic sprinkler system.

The administration building, located in front of the factory, is a one-story, steel-frame structure housing plant administrative personnel, the West Coast sales office, and technical and experimental laboratories. At the main gate is a canopy-roofed guardhouse with luminous ceiling.

Architects on the project are Horn and Mortland; structural engineers are Brewster and Greulich, with partner B. J. Greulich in charge; mechanical engineer is Gordon S. Stiles; and the electrical engineers are McDougald and Leino—all of Fresno, Calif. The general contractor is Baldwin-Erickson-Campbell of Marysville, Calif.

For an example of the cost and weight savings A36 steel offers in a tall building, please turn the page.



Steel-framed factory, with 50-ft bays, extends 800 ft between two warehouses at opposite ends.

...On a 20-story tower, redesign in A36 saves 8%

Redesign in A36 steel pared 310 tons of steel from the structural frame of a 20-story office tower originally designed in A7. Weight and cost were about 8% below the A7 figures.

Total cost reduction achieved by the substitution is estimated at about $90,000.

The consulting engineers originally designed an A7 structural frame for the $8.5-million Connecticut Bank & Trust Co. building in Hartford's $50-million Constitution Plaza project (ENR Oct. 27, p. 82). After the American Institute of Steel Construction had set allowable stresses for design of A36 steel in July, 1960, the engineers redesigned the 20-story frame to take advantage of the 9% higher yield strength of A36.

• **Savings**—Breakdown of the weight savings shows an 8.9% average weight reduction for beams and girders and 6.7% for columns. The columns, typically cover-plated 14WF sections, comprised about 40% of the total steel tonnage of 3,560 tons. The 8% total steel saving is somewhat less than the saving attainable in one-story buildings, where the columns, less favored by allowable stress increases than bending and tension members, make up a smaller proportion of the total steel tonnage.

The basic column design formula for A36 steel yields theoretical weight savings of 10% for columns in the L/r range of 50, but no savings at all for columns with L/r of 120 or more.

Cost saving approximates the 8% weight saving, since the unit cost of A36 is only $1 per ton (less than ½ of 1%) more than A7 for rolled sections.

The bank building, second of five buildings in the Constitution Plaza project, has a four-story base, measuring 91 x 289 ft in plan. From the base a 69 x 181-ft tower rises.

Floors in the tower are ribbed metal deck with concrete fill spanning between, 16-in.-deep light beams spaced about 7 ft c-c. Floor slabs in the base building are reinforced concrete.

• **High finance**—A high-ceiling banking area features two heavy steel trusses, spanning 66 ft and carrying two columns each at third points. The trusses are 14 ft deep, one-story high. One truss, fitting between the fifth and sixth floors, supports two 14-story columns and suspended fourth-floor framing. The other, located between the fourth and fifth floors, supports two 15-story columns.

Steel saving on main members of these two trusses amounted to three tons, a 5½% reduction.

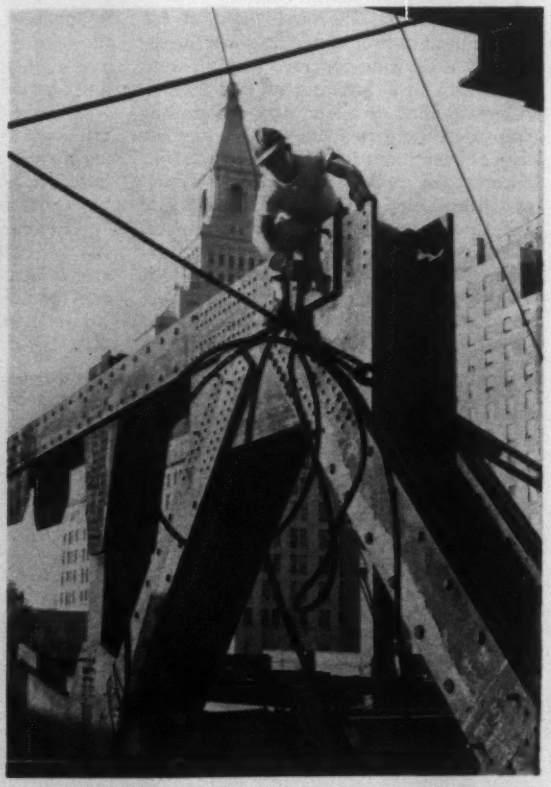
Wind bracing for the tower consists of rigid column-girder joints, with angles and structural tees resisting moment stresses in the connections. Typical wind girders are 18WF sections. The fabricator-erector is making all field connections with high-strength bolts.

There are no shear walls, K-bracing, or other type of lateral bracing.

Topping out of the building is scheduled for mid-November, with completion scheduled for fall, 1962. All five major buildings in Constitution Plaza are now under construction, and the entire project should be completed sometime in 1963.

Associated architects for the project are Robert Allan Jacobs and Carson, Lundin & Shaw. Weiskopf & Pickworth are structural engineers. All design firms are from New York City. F. H. McGraw & Co., of Hartford, is general contractor for all buildings in Constitution Plaza. Bethlehem Steel Co. is fabricator-erector for the structural steel in the bank building.

A 20-STORY BANK BUILDING, redesigned in A36 steel to save 310 tons, rises in Hartford's Constitution Plaza.



GIANT TRUSS will carry two 15-story columns over high-ceilinged banking area.

Mixing and placing a Cationic Bitumuls "mat" with a Moto-Paver. Note how closely the roller follows the paver.

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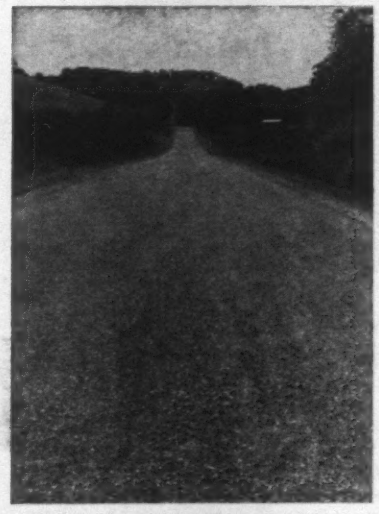

This is a completed Cationic Bitumuls Drag Seal Job.

North Carolina forces apply cover aggregate to a Cationic Bitumuls Split Seal on 8.1 miles of State Highway.

Since 1958, when we first introduced Cationic Bitumuls, it has gained steadily in acceptance by State Highway Engineering Departments all across the nation. Now, in twenty-one of our fifty states this material is in actual use. It is being tested and evaluated by many more.

Here s how one State took to Cationics

In 1958, The State Highway Commission of North Carolina took delivery of 100,000 gallons of Cationic Bitumuls so that one of their fourteen Divisions could do experimental work. When the results were evaluated here's what they found:

1. Early rains didn't damage the work.
2. The roads could be opened to traffic sooner.
3. The surfaces held more cover stone.

Based on these performance reports, the Commission made Cationic material available to all fourteen Divisions. In 1959, they used a total of 4,000,000 gallons. Last year (1960) 8,500,000 gallons!

How Cationic Bitumuls is used in North Carolina

North Carolina uses Cationic Bitumuls for two basic types of work: Split Seal, Drag Seal (Double Surface Treatments), Single Seal, Triple Surface Treatments; and Moto-Paver Mixes. Aggregates used vary from one area to another but the principal ones are gravel, granite, slate and limestone. Cationic Bitumuls performs uniformly well with all of these.

Cities, too, adopt Cationics

Many cities in North Carolina have switched to Cationic Bitumuls for much of their street and road work, profiting by the experience of the State Commission.

This same process is going on all across the country as more and more engineers become familiar with the high-level performance of Cationic Bitumuls.

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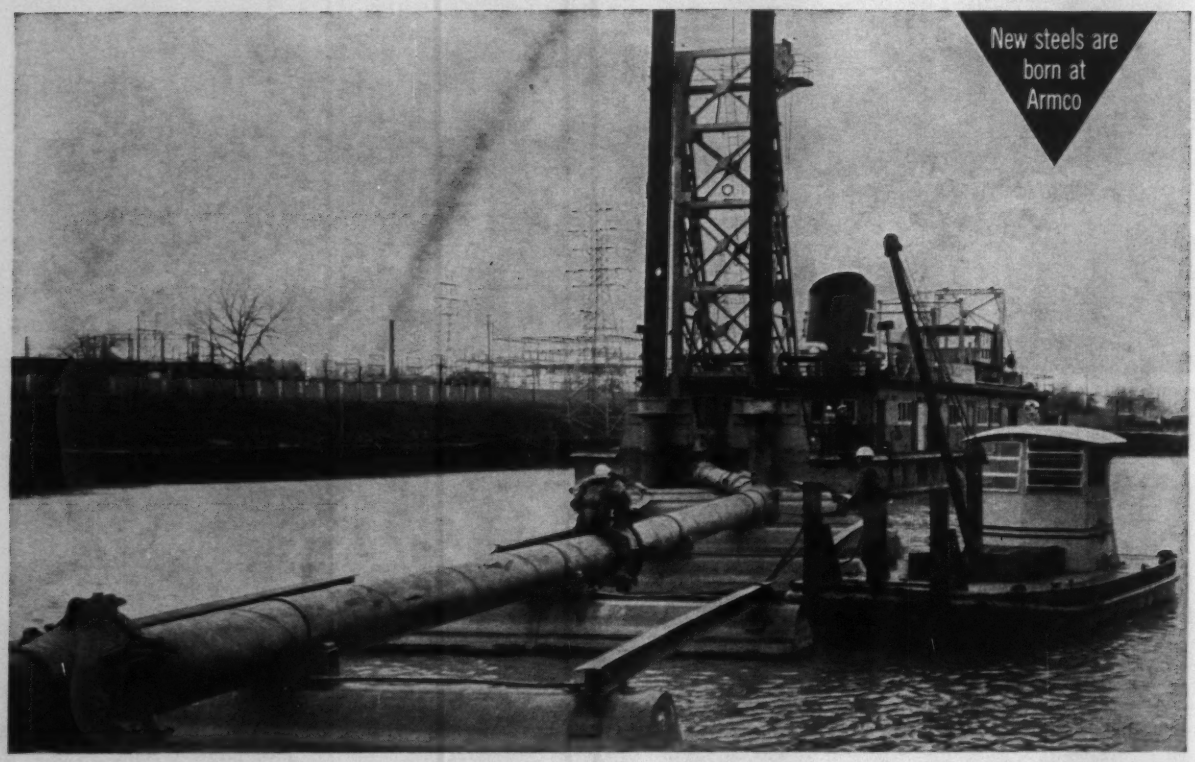


To widen the Louisville-Portland Canal, near Louisville, Kentucky, dredge in background hydraulically removes sand, silt and rock through the Armco Dredge Pipe mounted on pontoons.

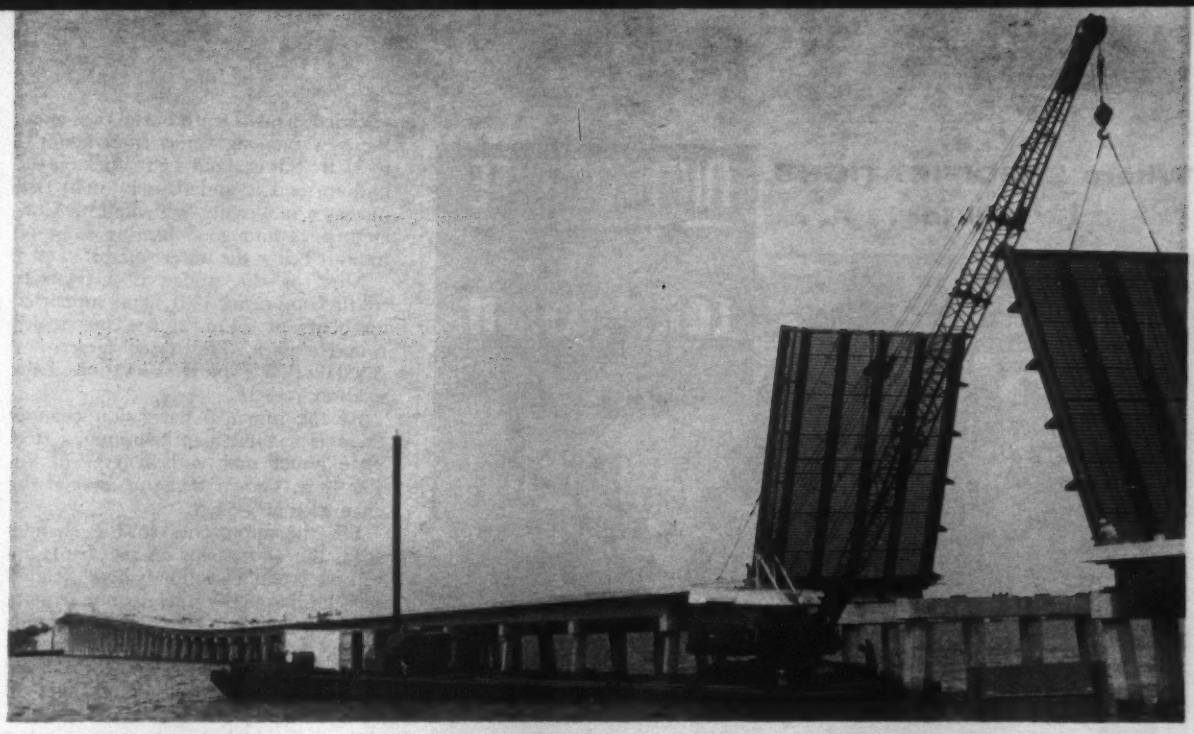
For strength, economy, durability — Steel

"Experience has proved that we get longer life from Armco Dredge Pipe, giving us more yardage at less cost," said Dunbar & Sullivan Dredging Co. of Detroit, who used Armco Dredge Pipe to handle 2½ million cubic yards of material in widening the Louisville-Portland Canal.

Dunbar & Sullivan utilized 1000 feet of 22-inch I.D. Armco Pontoon Dredge Pipe in 40- and 80-foot lengths. Pipe wall thickness was .438-inch. Ball joint fittings were welded to the pipe at the Armco plant.

Armco Dredge Pipe is made of a special steel, developed to withstand abrasive materials and rough service. It is supplied with various mill-fabricated fittings for dredging service. Write for informative folder. **Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corporation, 6671 Curtis Street, Middletown, Ohio.**

ARMCO **Drainage & Metal Products**



St. Johns River crossing contains bascule leaves designed to be opened by truck cranes.

Draw Spans for Emergencies Only

A new steel-and-concrete structure soon will replace Florida's longest remaining timber trestle, the 2.3-mile Shands Bridge over the St. Johns River near Green Cove Springs. It will include a non-counterweighted, twin-leaf bascule bridge designed to be opened by two light truck cranes for emergency passage of large vessels.

• **Navigation requirements**—Both highway and waterway traffic are increasing rapidly in this area. The St. Johns is navigable for barges 100 miles upstream from the bridge site, and water traffic on the proposed cross-Florida barge canal will pass this point.

The old bridge has a double leaf bascule span. But the expected increase in river traffic made a fixed, high-level bridge desirable to eliminate delays and hazards to both water and highway traffic.

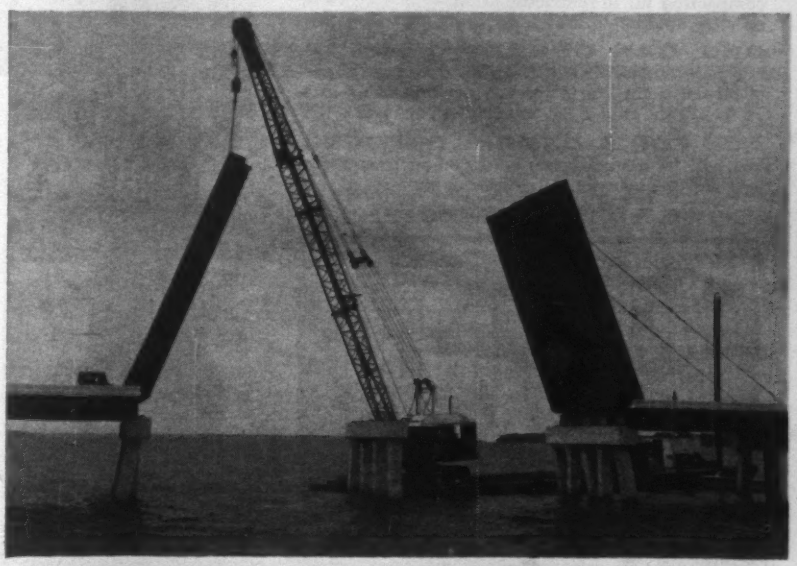
For this reason the Florida State Road Department in 1958 applied to the Corps of Engineers for approval of fixed clearances of 90 ft horizontally and 45 ft vertically. Engineers believed the vertical clearance was adequate for all commercial barge traffic and for nearly all pleasure craft.

When the application was advertised, the U.S. Navy objected that the 45-ft clearance would restrict use of the upper river as a dispersal area for small craft in a national emergency. At the time, the Navy maintained a sizeable "moth-ball" fleet of small vessels about 1 mile upstream of the bridge site. Some of these vessels carry superstructures and appurtenances up to 100 ft high. (Since that time, most of the moth-ball fleet has been moved elsewhere.) Providing fixed clearance for such heights was considered impractical.

As a compromise, the Navy approved two hinged movable spans, each 40 ft long, with their free ends resting on a common pier. The bascule spans are located some distance from the main channel, in the low level trestle in about 15 ft of water. Each leaf has a light I-beam span with grid deck and simple pin-type hinges. Their cost is little more than that of a simply supported I-beam span.

The opening through one span will pass practically all small naval craft. For the improbable passage of larger vessels, both spans can be opened, the center bent removed and later replaced.

(Please turn the page)



DRAW SPANS use light steel I-beams to carry steel grid, are not counterweighted.

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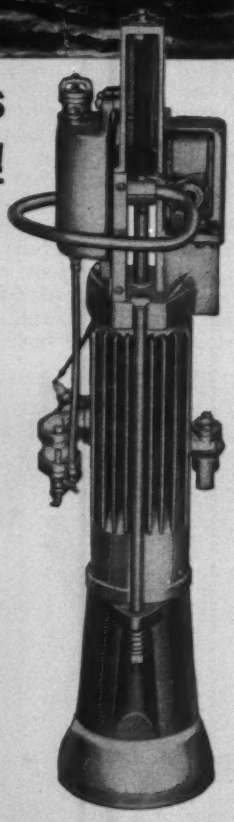

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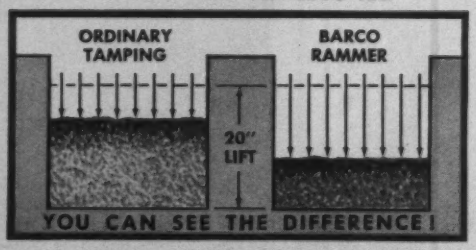

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Most of the bridge is a concrete trestle comprising 48-ft spans supported on bents of 24-in. square prestressed concrete piles. Prestressed girders are AASHO-PCI Type II. Elevation of the roadway is +16.

At the principal navigation channel there is a three-span continuous steel plate girder unit with lengths of 90-130-90 ft. Crown of the roadway at the channel is at +51 ft.

On the approaches to the channel span, the 48-ft spans on pile bents are carried to an elevation where slenderness limits on the piles require a more rigid substructure. Here the span lengths change from 48 to 72 ft, the prestressed beams change from Type II to Type III and the substructure changes to pedestal-type piers.

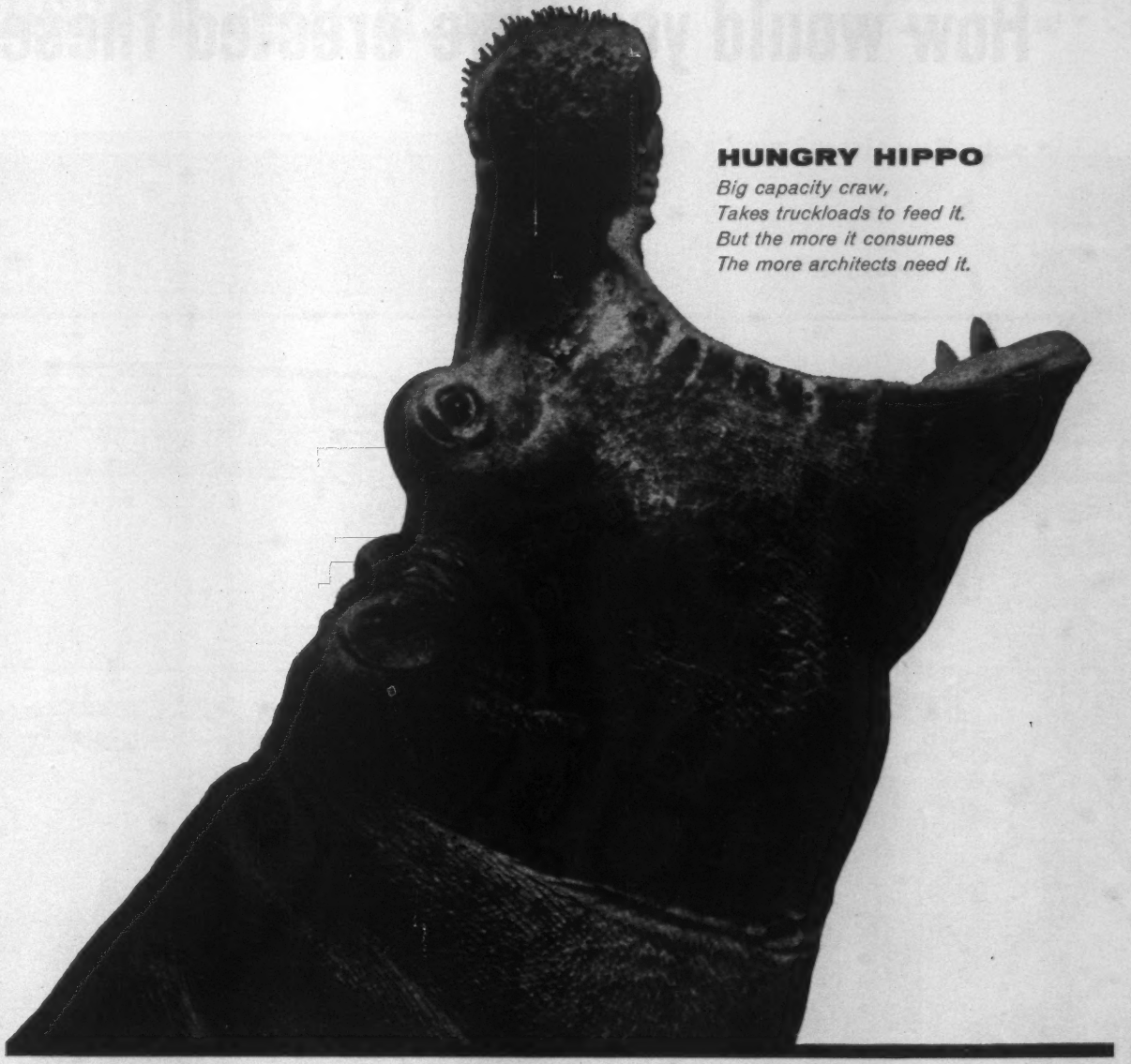
Each pedestal consists of two clusters of five 24-in. concrete piles, cut off 3 ft above the water, with concrete pedestals that support two-column rigid frame piers. No dewatering of the foundations was necessary, except for the piers immediately adjacent to the channel. There, because of possible collisions with vessels, the contractor built more massive piers in open cofferdams.

Location of the new structure about ½ mile upstream from the old reduced the length of crossing to about 8,500 ft; of this, 6,662 ft is bridge. The remainder is dredged fill causeway. Construction of about three miles of approach roadways will be necessary to put the new bridge in service.

• **Contractors**—Fierce competition (18 contractors bid for the work) drove the cost of the low level concrete trestle comprising most of the bridge's length to a low $5.83 per sq ft of deck area between handrails. Cleary Brothers Construction Co. of West Palm Beach is building the bridge under a $1.7-million contract. The low bid was about 17% below the engineer's estimate.

Cleary expects to complete the structure this month. Juno Prestressors, Inc. (a Cleary Brothers subsidiary) furnished the prestressed piles and Type II beams from their plant at Jupiter. These parts were delivered to the job site 350 miles away by barge. Capitol Prestress Company of Jacksonville supplied the Type III beams.

Engineers of the Florida State Road Department designed the bridge and are supervising construction. W. E. Dean is assistant state highway engineer (structures) at Tallahassee.



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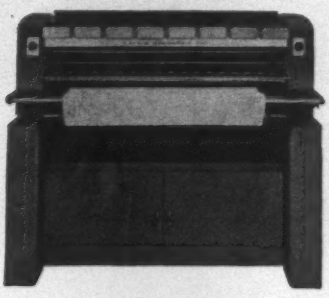

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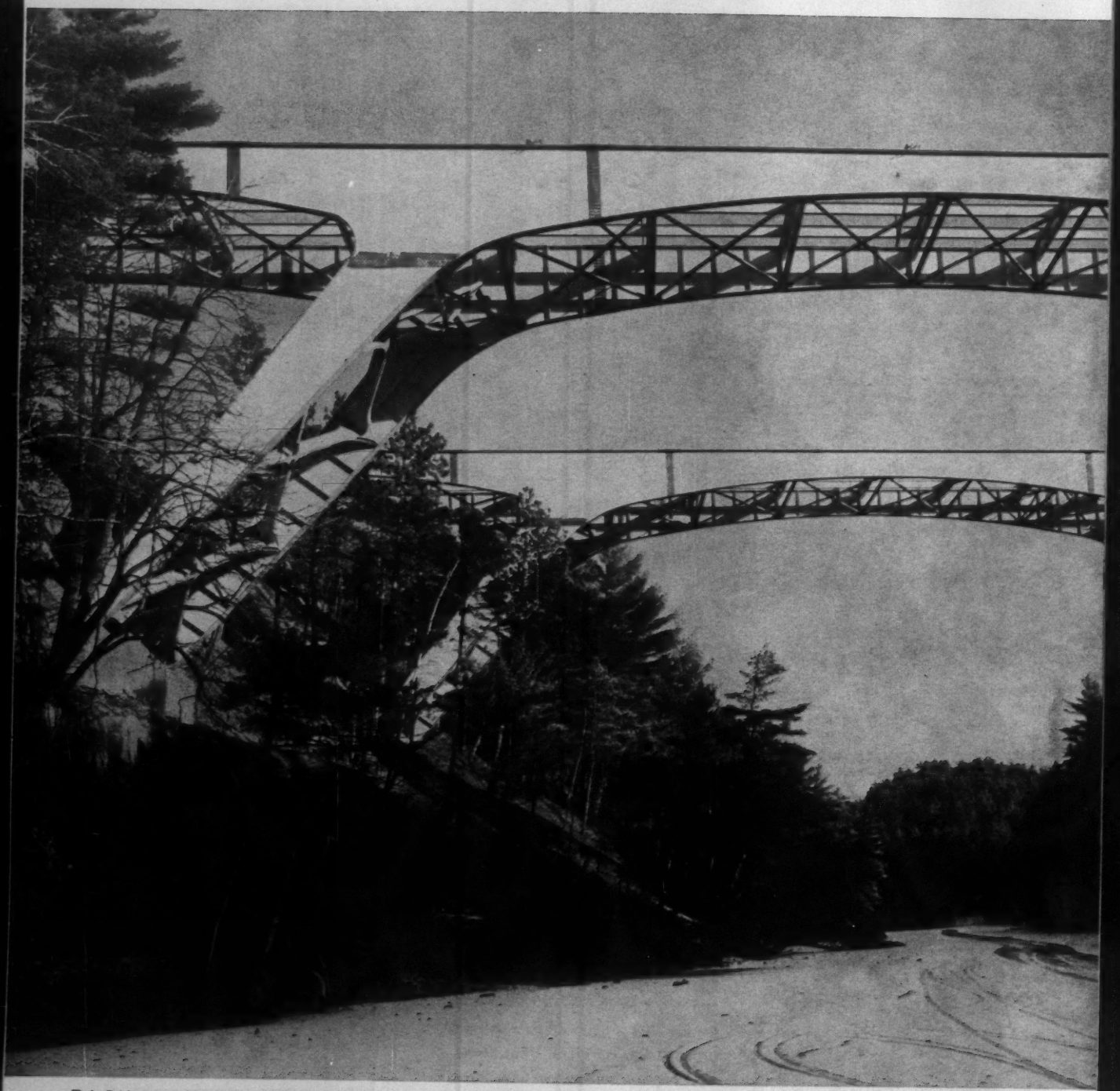

Twin Bridges over Mirror Lake, near Delton, Wisconsin. Designed by Wisconsin Highway Commission, H. B. Schultz, Bridge Engineer. General Contractor: L. G. Arnold, Inc., Eau Claire, Wisconsin.

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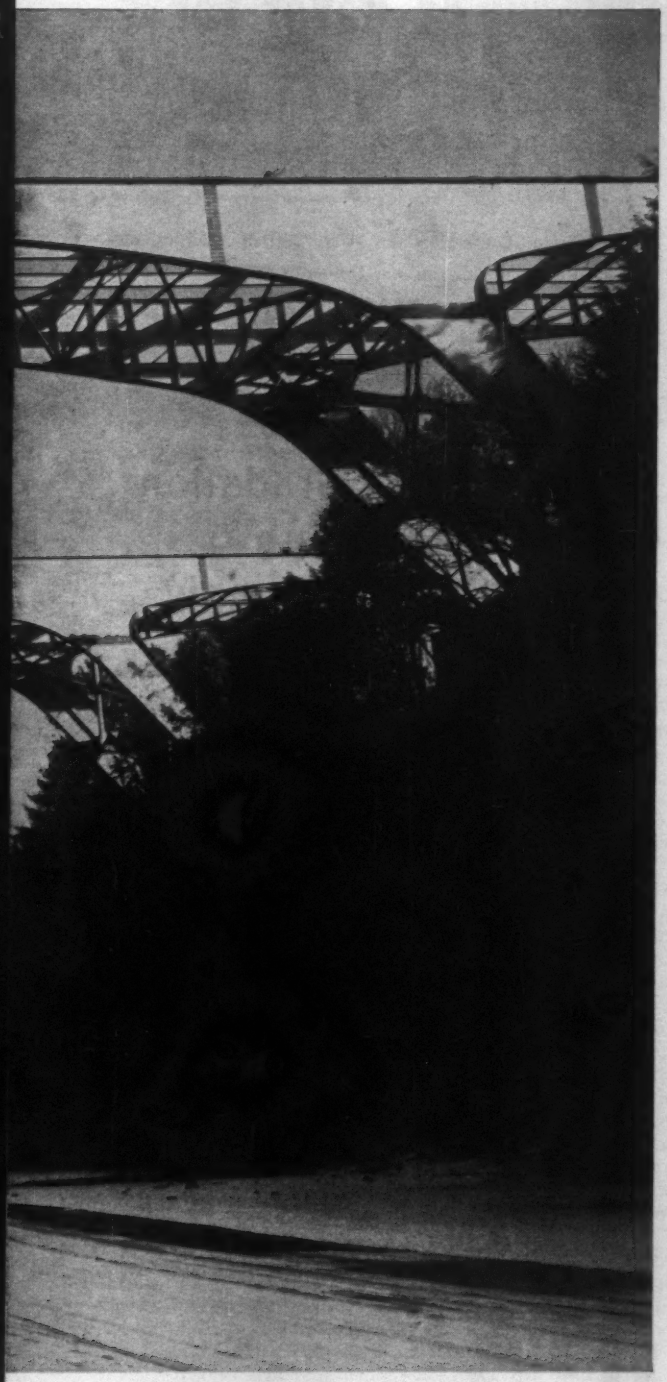
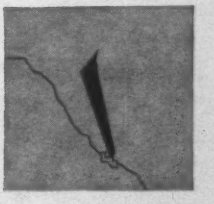


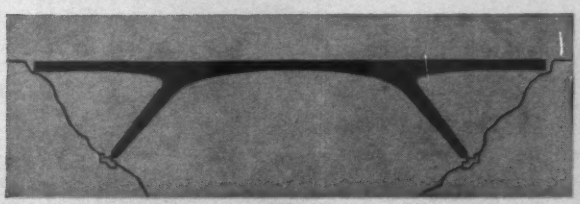
Here's how American Bridge did it:



1. First, a column was attached to its abutment and raised into a vertical position.

2. The haunch girder section was then lowered into place and fastened.

3. The whole section was rotated into position and the final girder set into place. The leg and span were then self supporting. This operation was repeated from both sides until all legs and end spans were in place.



4. Center spans were then slid down the embankment and hoisted into place.

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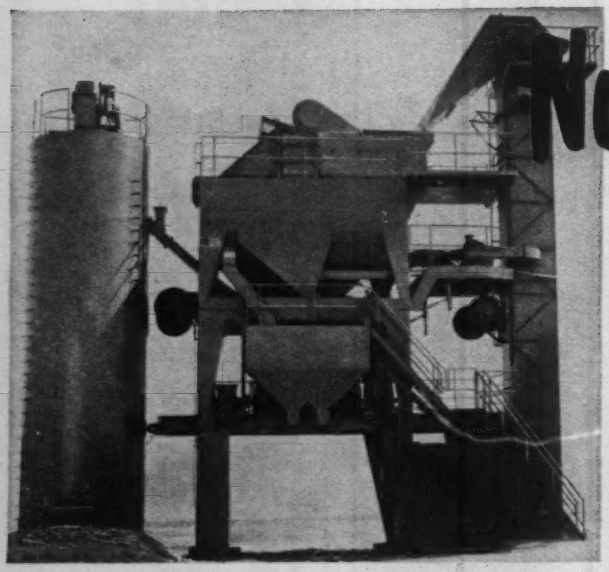
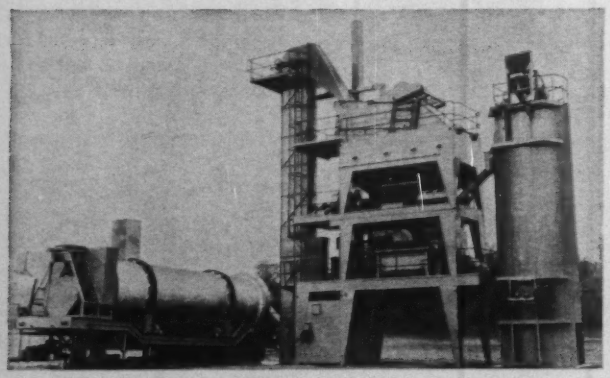
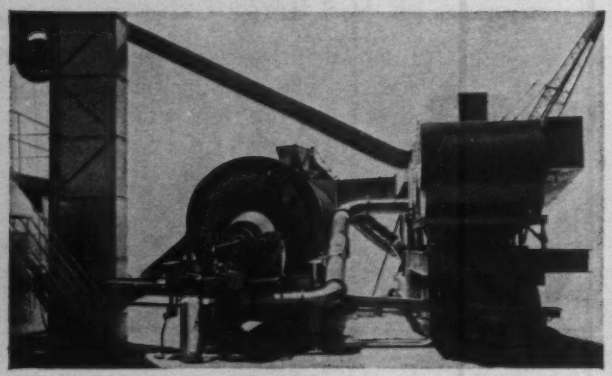


▲ Newly-designed Unitized Mixing Tower, for use with Mobile Dryer & Feeder equipment, 3000-lbs. to 8000-lbs. batch-rated capacity. Permanently-mounted handrails and walkways permit minimum dismantling for moving from one job site to another.



▲ Tower principles are retained, but sections are built 10′ or less, travel width. Easily transported with truck tractors. Used with mobile dryers, feeders, and asphalt tank assemblies. Only screen, control house, and connecting ducts need be moved on truck trailer. (Note wheel-mounted bulk filler dust silo)



▲ Typical 88″ or 100″ Diameter Mobile Dryer Arrangement. Mobile Two-Unit Dryer Assemblies available in 5 sizes. Diesel or electric driven.

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Check the photos at the left . . . note the many advantages and options. A few of the basic features include: completely mobile cold feed equipment for crane, loader, or dozer charging . . . flexible plug-in wiring throughout the plant with unitized electric control house incorporated into mixing house support structure . . . air control of all discharge gates with compressor permanently mounted in the mixing tower framing . . . H & B automatic cycle control for the timing and sequencing of the material from weigh batcher to truck.

Additional optional features include total automation, permanently-mounted running gear on hot elevator and hot bin, and trailer framing incorporated into mix and weigh section structure ready for use with detachable hitch assembly. For more information, contact your nearby H & B distributor or the factory direct.

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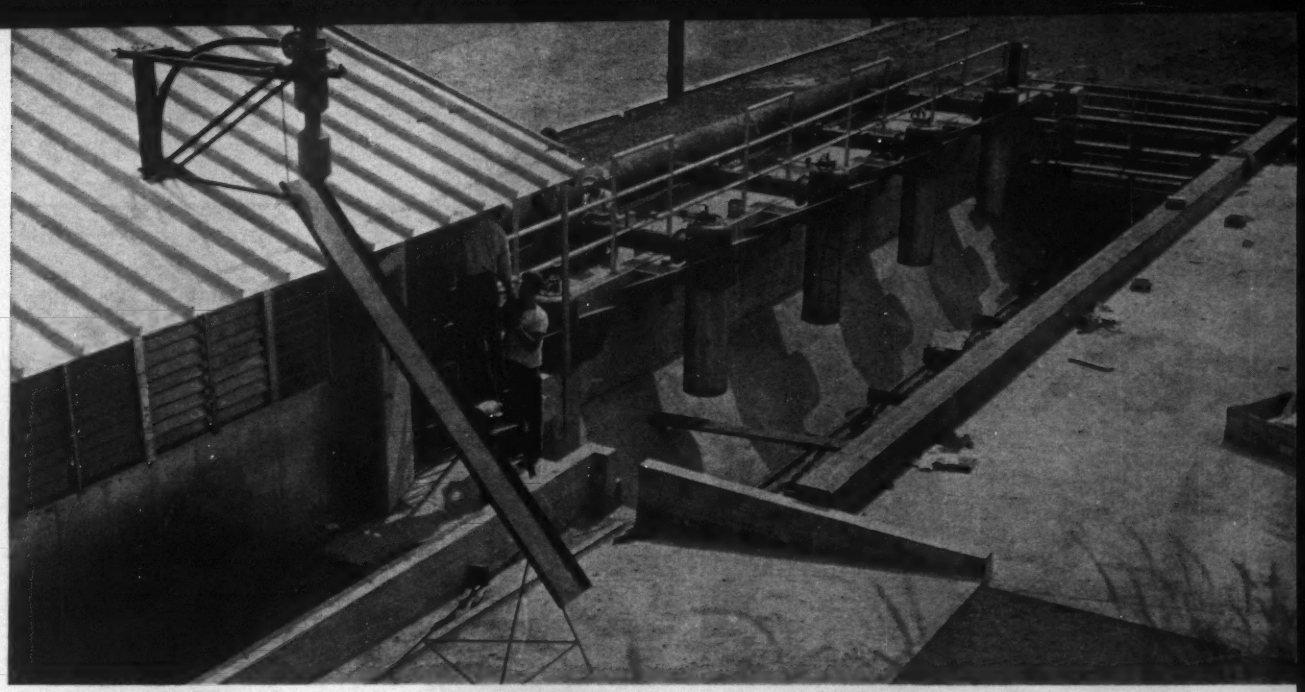


Sand separator (on control shed roof) and oil burners are features of town's . . .

Second-Generation Snow Melter

The city that built the first snow-melting pond back in 1927 has now built the biggest. Westmount, Quebec —25,000 people who don't like a lot of snow lying around—has finished the first unit of a two-unit plant that, when completed, will melt 20,000 cu yd of snow a day.

The old pond—coal fired, 21 x 60 by 10½ ft deep—handled 7,400 cu yd a day, less than half of the city's 110 in. annual snowfall. The new ponds will completely cope with an average year's snow.

Rather than update old equipment, the city found it cheaper to build new by incorporating several innovations for more efficiency.

The old pond would accumulate up to 28 tons of sand in a 13-hour day. Weekly draining was necessary to clean it out with a backhoe and dump trucks. City Engineer Robert Daye and Alex de F. Heron, superintendent of the light and power department, designed the new pond into a V-shape with a chain and flight conveyor at the bottom to pull settling sand into a sump at one end of the pond.

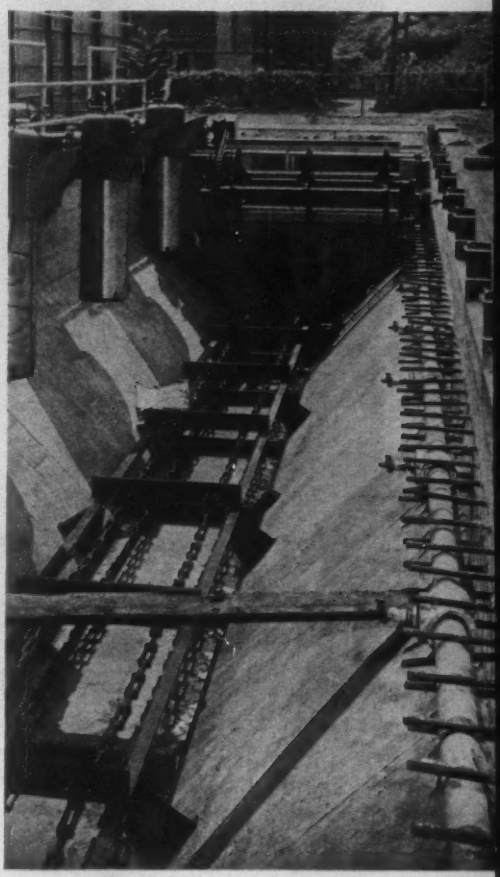
Sand is pumped from the sump through a 2-in. plastic pipe to a cyclone separator atop the control house roof. Separated water is returned to the pond and the sand chuted down to an electrically heated concrete pad to await truck removal.

The new pond is smaller than the old. Water level will be 6½ ft in a pond 14 x 50 by 9 ft deep. Five oil burners line one side to provide heat. Working all together they produce 60 million Btu per hour, enough heat to keep the water at 45 F. A two-stage, 200 hp air blower feeds all the burners through a common header. It is housed in the control shed along with a control console from which one man can put burners in or out of service as needed.

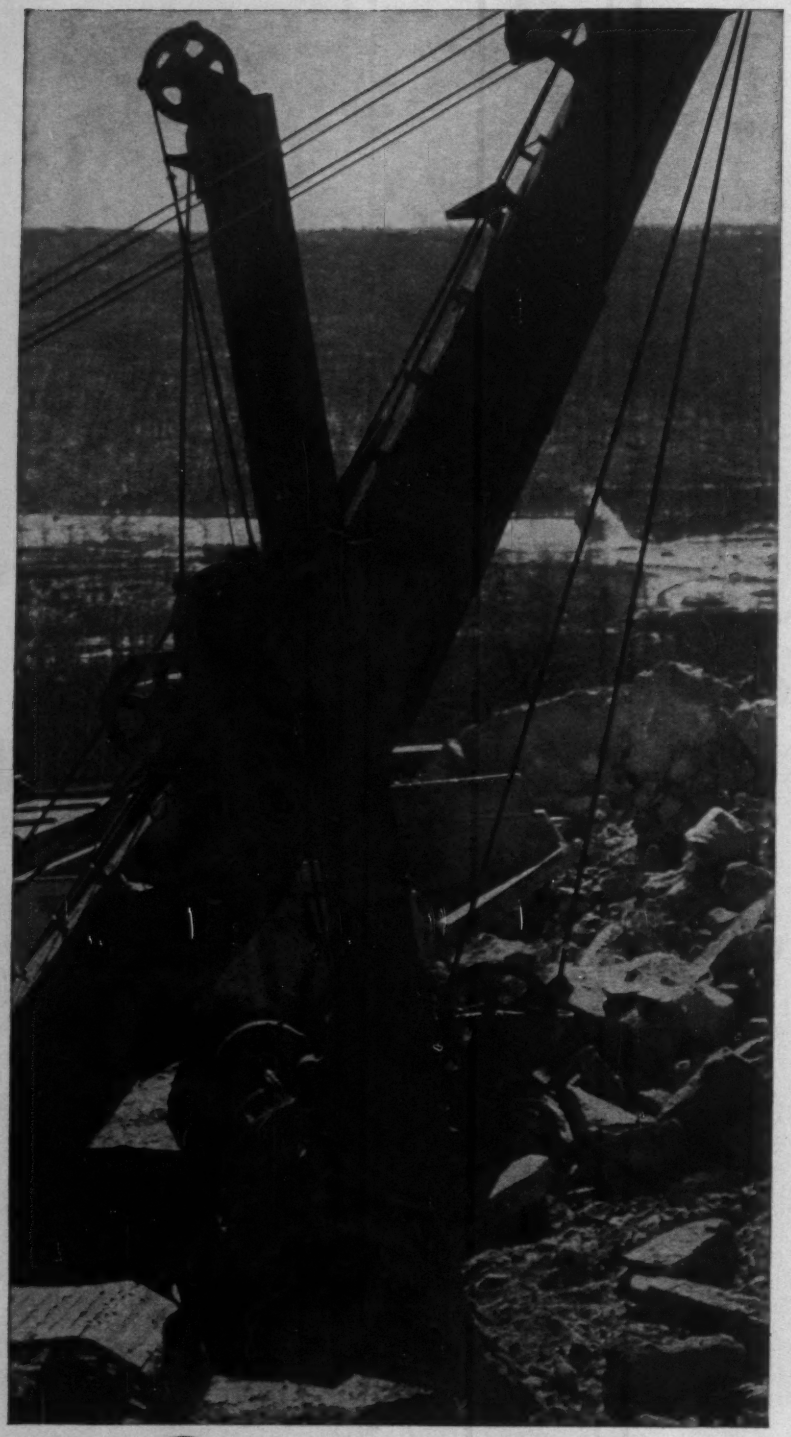
Each burner is set in a wide sleeve that dips 1½ ft into the water. Thus hot gases channel directly into the water and stir it up.

An unusual slush separator pit at one end of the pond draws off floating slush and washes it down the sewer. A 7-ft-wide "paddle wheel" slush rake draws slush over a weir onto an inclined grate made up of slats, which chutes slush off into a 24-in. drain. Water that drips through the slats is sprayed back into the pond through nozzles that line one side of the pond and are angled toward the weir, both speeding melting and helping move slush toward rakeoff. The plant is designed to melt half the snow delivered to it and dispose of the other half down the sewers as slush.

A 60 x 80 ft site serves the whole two-unit installation. The old pond will be used this winter, then retired. The second pond of the new installation—to be built next summer—will tie right onto the pond already built and use the same slush pit and oil storage tanks. Price of the finished unit is $135,000, and operating costs are estimated to be one-third less than the old pond.



SAND RAKE automatically clears bottom. Nozzles (right) sweep slush to weir.



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Letter from Prague—

World Views on Concrete Durability

(Special Report to ENR)

Problems relating to the durability of concrete are no respecters of curtains, iron or otherwise. This was well shown at a symposium on the durability of concrete held recently in Prague, Czechoslovakia.

Sponsored by RILEM, the international association of building material laboratories, whose current president is Professor St. Bechyne of the Czechoslovakian Academy of Sciences, the conference was organized by the Czech Institute of Theoretical and Applied Mechanics, a constituent part of the Academy.

Of the 400 delegates present less than one third were from western countries, and only four from North America. Nevertheless, the meeting was indistinguishable from a similar conference in the west, even to the use of English as the principal language of communication.

A dominating impression was that just as North American engineers are apt to neglect the literature of Europe in background reading for their own researches, so the engineers of eastern European countries did not seem to be too familiar with the corresponding literature of North America.

Most of the topics discussed at Prague have received attention at meetings of the American Concrete Institute, or of Committees C1 and C9 of the American Society for Testing and Materials. There were, however, many fresh approaches and much information presented regarding actual field experiences that will add to the world-wide store of knowledge in concrete technology.

For example, in addition to the methods normally used in North America for durability testing, attention was directed to a combined chemical and freezing test method, advocated by W. Gaca of Poland and Inge Lyse of Norway.

One such test involves immersion of test specimens in seawater with a five-fold concentration before subjecting them to regular freeze-thaw cycles. It was suggested that results obtained in this way give a reasonably good indication of durability after only seven days.

A new method of assessing aggregate-cement bond was described by O. Valenta, of the Czech Institute. A prism of concrete is broken across and a new prism of cement paste is then cemented to the fractured surface. The permeability and strength of the new interface are then measured, before and after freezing cycles.

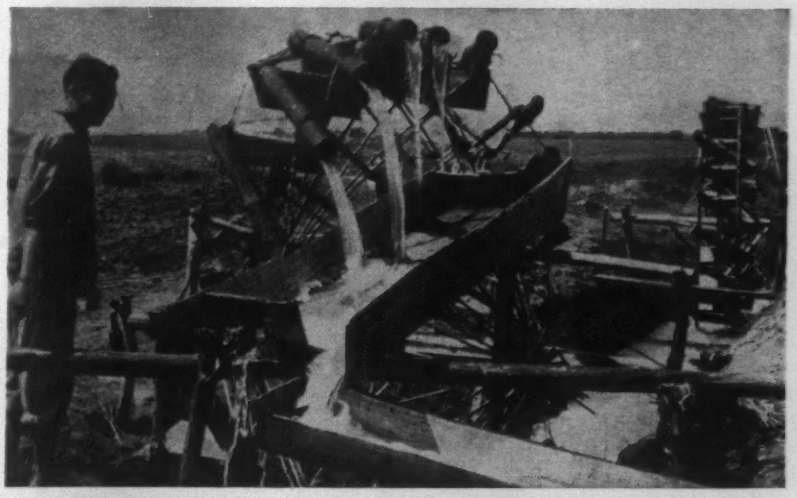
From Poland came a report by E. Janczewski of some unusual concrete deterioration definitely traced to biological action. The trouble occurred in the concrete lining of some very deep tunnels built in 1952 and 1953 in connection with preliminary work for the Warsaw subway. The concrete, of 1:1:2 proportions made with ordinary portland cement, was placed against unimpregnated pine board formwork, which was left in place. Some 3 years later, disintegration of the concrete was first noted. An intensive investigation revealed that it was due to the fungi *Merulius lacrymans* and *Poria vaporaria* commonly known as wood destroying bacteria. Although the concrete provides no nutrient for the fungi, they are able to penetrate solid concrete in search of food and light, causing considerable damage in so doing not only by mechanical action but also by the secretion of organic acids.

From the USSR came an account of the frost resistance of heat treated concrete in a paper by S. A. Mironov. In 1961, almost 40 million cubic yards of precast concrete units will be produced in Soviet precast plants, practically all of which will be heat treated by autoclaving or by steam curing. (Electric curing of monolithic concrete structures is also achieved in the field in the winter by heating reinforcing steel.)

Tests have shown that autoclaving is definitely superior in imparting durability. In one case, identical samples, which withstood over 200 cycles of freeze-thaw testing after autoclaving, showed a loss of strength of from 27% to 36%, as well as surface deterioration, after only 100 cycles following ordinary steam curing.

The paper also reported that the best additive for increasing the frost resistance of heat-treated concrete is an organic silicon compound in the form of an aqueous emulsion, described as a polysiloxan fluid.

All of the papers and discussions will be published in bound volumes, information on which can be obtained from RILEM headquarters, 15 rue Brancion, Paris, France.



Water Powers Water Pump

This ingenious water-powered pump can irrigate 6½ acres of farmland a day, according to the Communist Chinese who dreamed it up. Made entirely out of wood, scrap and strings, it uses the current in the irrigation ditch pushing on its paddles to turn it. Once in place, it lifts water in its inclined tubes as long as there is water moving in the ditch.

This one is in Kwangtung Province near the Manchurian border.

Mr. Thompson, left, and American Mutual District Sales Manager George R. Weber look over one of the two new units added by Thompson Construction to General Electric's Silicone Products plant in Waterford, New York.

"I like a man who sticks with the job"

John S. Thompson, President of The Thompson Construction Corp., General Contractors of Albany, N. Y., says, "George Weber of American Mutual covers all the bases. With his help, we've cut our Workmen's Compensation costs 19% below the industry average over the last five years."

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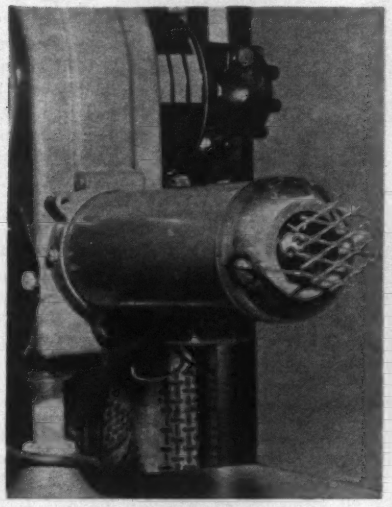

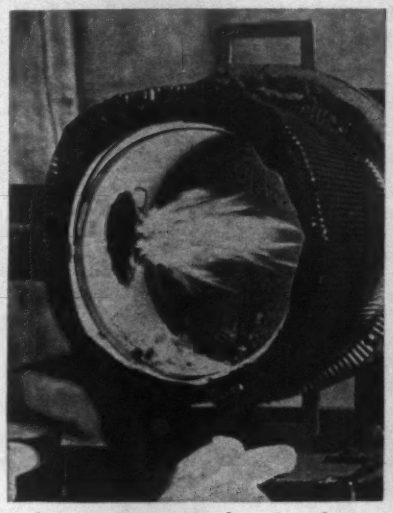

Heat booster on nose cone . . . produces quiet, even burning flame.

Metal Grid Cuts Fuel Oil Costs

Magic-Grid, a heat booster, can shave as much as 20% from home oil-heating costs. The device raised the average efficiency of 30 house-tested burners from 71% to 83%, for an average yearly savings of $53.50 per house.

High-pressure oil burners are inefficient, say developers of the device, Esso Research and Engineering Co., because the velocity of the air-fuel mixture exceeds the velocity of the flame. Thus, combustion cannot occur in the central area of the flame, fuel is wasted, and excessive smoke is created. After extensive testing in a quartz-windowed combustion chamber, Esso also discovered that the average No. 2 oil burner has a pulsing, noisy flame.

The device, an expanded-metal grill, by slowing down the air-fuel mixture increases burner efficiency, reduces noise levels and completely eliminates smoking, Esso reports.

Because, the grid changes the characteristics of the flame, alterations in the burner itself also are required. The firing rate must be reduced. And an add-on ignition control, which raises the selling cost of the heat-booster package, is needed.

Humble Oil and Refining Co. will market the Magic-Grid through its affiliated Esso oil dealers on the East Coast. Total installed cost, including sizing of the combustion chamber and a money-back guarantee, will be about $55. Humble Oil and Refining Co., 15 W. 51st St., New York 18, N.Y.

Elevator Control Cuts Waiting Time

Unlike conventional elevator control systems, which dispatch elevators according to a forecasted demand pattern for an entire elevator bank, the Selectomatic Mark IV control system dispatches each car individually, as demands arise.

Because of this selective control, the Mark IV has reduced waiting time for elevators by 30.6% in the 40-story Tishman Building—which moves about 8,000 New Yorkers a day.

Key components of the Mark IV are an electronic scanner that registers all demands and the load of each cab, and a computer that analyzes demands and dispatches the appropriate cab.

Working together, these two components can control cabs on a demand reversal pattern. Thus, up cars can be made to answer a down demand, and down cars can reverse to answer up calls. The cars have no routed terminals, except by immediate demand.

If there is no demand for a car, the Mark IV will hold the car where it last stopped. And if there is a flurry of calls in one direction, cars are dispatched one at a time to the highest and the midpoints.

As other cars are available, the demand flurry is re-analyzed and again serviced at newly calculated, optimum locations. Westinghouse Electric Corp., Elevator Division, Jersey City, N.J.

100 years of experience back ROBINSON'S 100-year guarantee*

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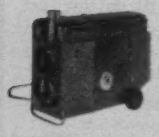

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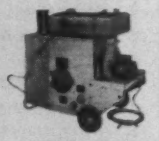

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Epo Liquid Hi-Build Coating, for protecting porous surfaces against corrosion, abrasion and chemicals. Bonds with less than 2% shrinkage. High-gloss finish. GEORGE E. FINES, INC., 18640 WYOMING AVE., DETROIT 21, MICH.

Work Shelters

Ribbed aluminum Jiffy Rooms assemble with screw driver and pliers. Four colors, seven sizes to 9 x 7 ft. All 6 ft 6 in. high. All rooms vented; windows optional. L. S. WILSON MANUFACTURING CO., 371 E. 116TH ST., CHICAGO 28, ILL.

Tuckpointing Machine

The Pres-Tuck Applicator speeds window calking, tuckpointing of brick or stone, and filling cracks in concrete walls or driveways. Low-pressure air, supplied from a standard compressor, forces mortar through a rubber-coned container and out a hose and nozzle at a uniform rate. The worker controls the flow of mortar by adjusting air pressure and changing nozzles. PRES-TUCK APPLICATORS, P. O. Box 11, WESTERN SPRINGS, ILL.

Lighting Control

Dreamliter 600, incandescent light dimmer. Fits into a standard, single wallbox. Controls light intensity from full dark to full bright on circuits up to 600 watts. $24.95. ELECTRO-SOLID CONTROLS, INC., 8001 BLOOMINGTON FREEWAY, MINNEAPOLIS 20, MINN.

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Model 10 Pippin Hydraulic Winch has line pull of more than 17,000 lbs. No power take-off is required when hydraulic power is available. It also can be powered by an electric motor-driven hydraulic pump. WINDSOR PIPPIN CORP., WINDSOR, VT.

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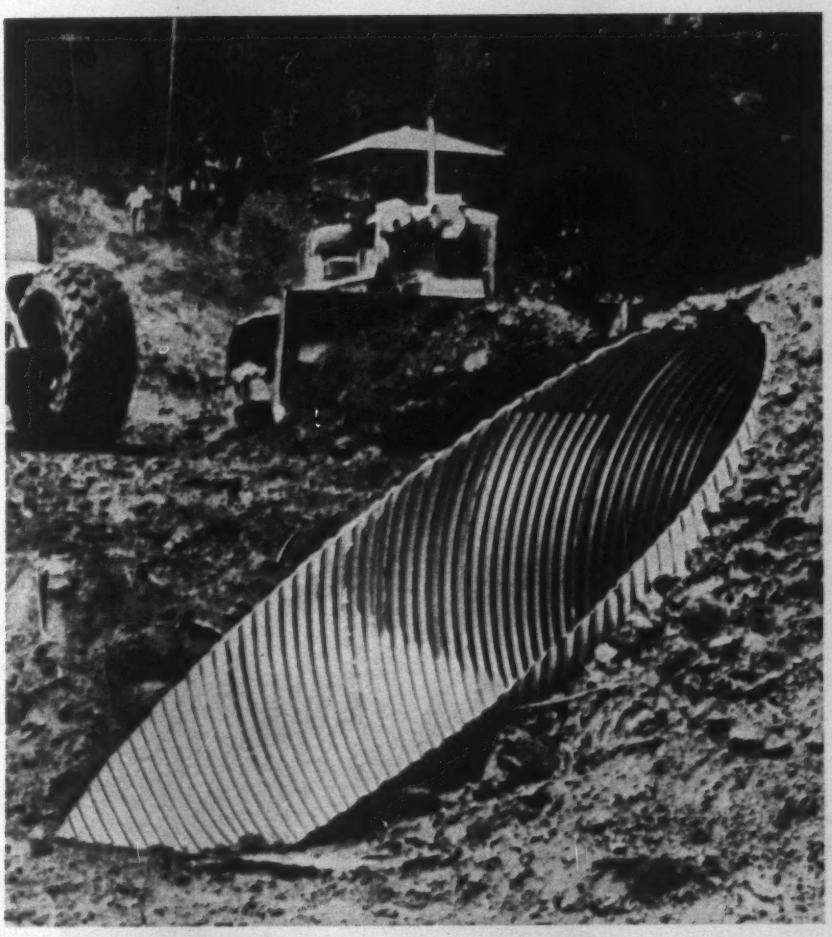
Concrete Waterstop

Nail-On Duo-PVC waterstop has a prepunched nailing tab and a flexible U-bulb center rib. Nails supplied. W. R. MEADOWS, INC., 26 KIMBALL ST., ELGIN, ILL.

This mark tells you a product is made of modern, dependable Steel.

The old plank bridge was falling down — so they replaced it with a steel culvert



Road Project: Madison County, Iowa **Culvert Fabricator:** Midwest Culvert Company

It would have cost Madison County, Iowa, too much to repair the wooden bridge that used to be here on this secondary road. So, they tore it down and replaced it with an 84-inch beveled end 8-gage galvanized steel pipe. Then they graded the road over the pipe. It took only a half day to install this drainage pipe made from USS Corrugated Galvanized Steel Culvert Sheets. So they saved quite a bit of construction time and money. And they expect the pipe to last 50 years—without any maintenance. For more information about USS Corrugated Galvanized Steel Culvert Sheets for drainage pipe, send for our free booklet, "Culvert Sheets for Metal Drainage Products." Write United States Steel, Room 6295, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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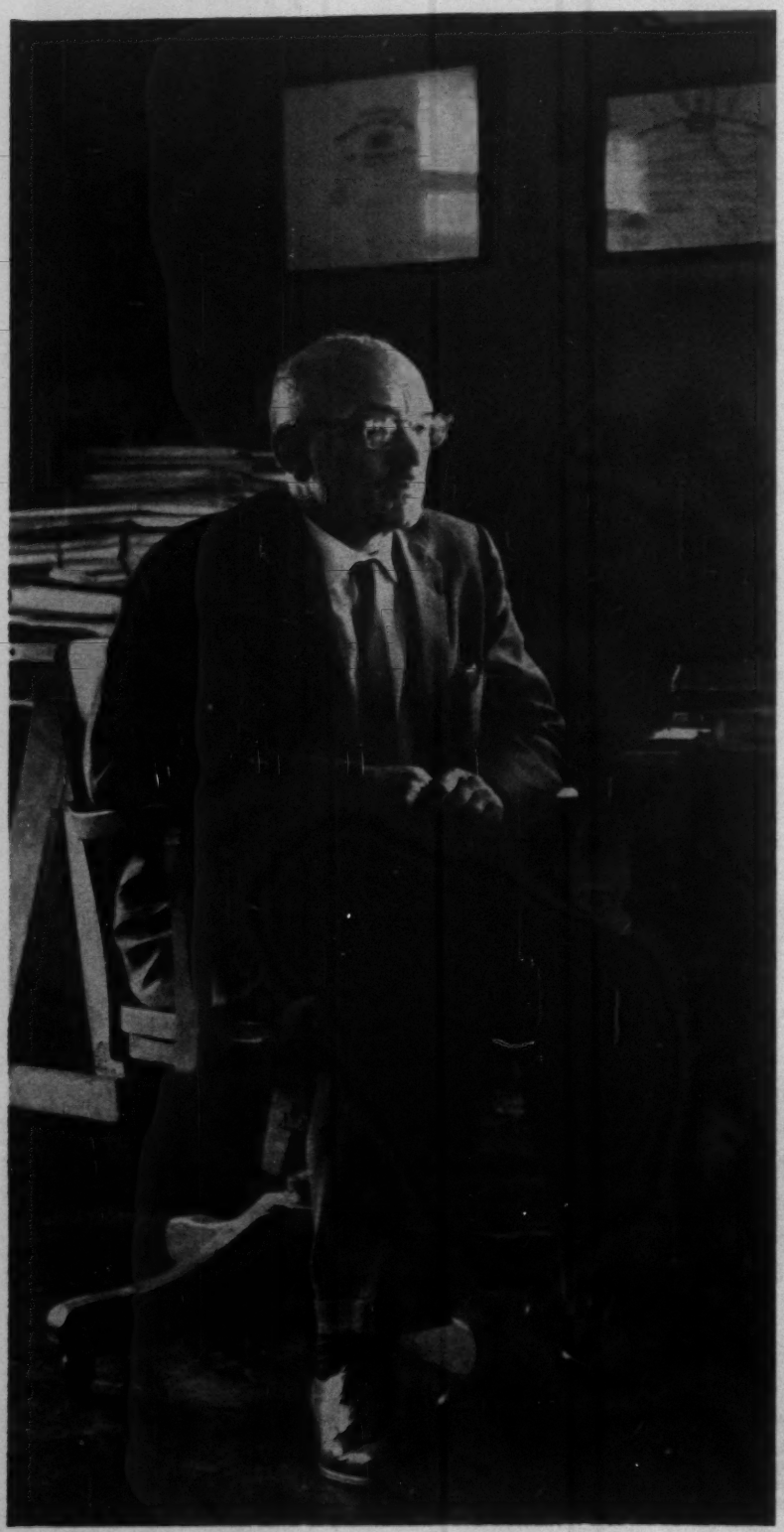


JACOB FELD: "The subject of failures was formerly taboo; publicity has helped . . .

Specialist

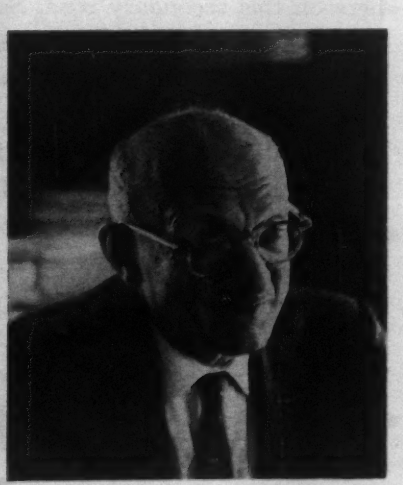
For nearly 40 years, the diagnosis of sick and ailing structures has been a hobby as well as part of the practice of consulting engineer Jacob Feld of New York City. Now Mr. Feld advocates some preventive medicine for the whole construction industry. His prescription: structural insurance similar to fire insurance with a "technical control" bureau reviewing and inspecting all phases of construction.

During the 37 years that he has been earning his international reputation as an M.D. of structures, Mr. Feld has observed and analyzed building industry practices. Because of many changes in these practices he feels that the time has come for the U.S. to adopt a system that has proved itself in Europe.

• **Origin of a calling**—Mr. Feld's fascination with structural failures dates back to the summer of 1924, when he was designing retaining walls and abutments for grade crossings for the Long Island Rail Road. "Fantastic" is the way Mr. Feld describes several interpretations of his plans by bar-placing foremen.

One foreman, justifying the placing of main tension dowels along the wrong wall face, explained his deliberate change from the plans: "The earth holds up the backface and the bars hold up the other face." Another foreman cut the main continuous horizontal bars in a counterfort wall to facilitate placing.

Since establishing his engineering practice in 1926 (four years after earning his doctorate at the University of Cincinnati) Mr. Feld has counseled



hardly a day goes by without a call . . .

on Sick Structures Speaks Out

clients on every type of structural failure—from fatigue-failing elevator rope to cracking plaster, from settling foundations to sagging slabs. His clients include owners, architects, other engineers, contractors, mortgage companies, surety companies and municipalities. He is also a special consultant to the U.S. Air Force. And while practicing construction medicine he has also carried on a healthy design practice that includes such notable structures as the New York Coliseum and the Guggenheim Museum and basic studies for large radio telescopes.

"Hardly a day goes by that I don't get a call on some structural difficulty or other," says Mr. Feld. And the jangling telephone, his voluminous file of 1,000 failure case histories, and the reports and blueprints stacked high on a drafting table bear him out.

The general atmosphere of busy-ness in Mr. Feld's mid-town Manhattan office reflects his personality. No one will ever mistake his office for a Dorothy Draper interior. Near one window head the flaking surface of grey-painted plaster walls mutely testifies to better days in the past. (The office was once the Tammany Hall clubhouse.) The rough-finished concrete ceiling and the old oak filing cabinet mark the home of an engineer too much absorbed in work to bother about office aesthetics.

Like the eager-beaver air cadet who broke his leg on the obstacle course and did push-ups while waiting for the stretcher, Mr. Feld occupies his professional spare time writing technical articles, delivering lectures—usually on his favorite topic—and in organizing the engineering division of the New York Academy of Sciences.

Throughout the years, his pioneering work has made him a Vesalius of structural medicine, breaking down the taboo that kept the subjects of "failures" and "collapses" out of most engineering journal indexes before 1950.

• **The "shadow of the boss"**—Despite many technological advances made during his long engineering career, Mr. Feld believes that shoddy construction is increasing. There is a general lack of sharp-eyed field supervision in several phases of construction. Basically, what is missing today, says Mr. Feld, is the "shadow of the boss."

Among the specific causes of shoddy construction in the New York metropolitan area (and in many others), Mr. Feld cites these as major factors:

• Pressures and tight schedules of a high volume on construction straining the limited supply of technical personnel and lowering standards of shop and field inspection.

• Use of new materials and combinations of materials before adequate engineering knowledge has been accumulated.

• Mechanical equipment (e.g., power buggies and mechanical vibrators) subjecting formwork and other parts of buildings to dynamic stresses not present in work done before the advent of highly mechanized construction.

• Lower standards in work of testing laboratories caused by price competition on many projects.

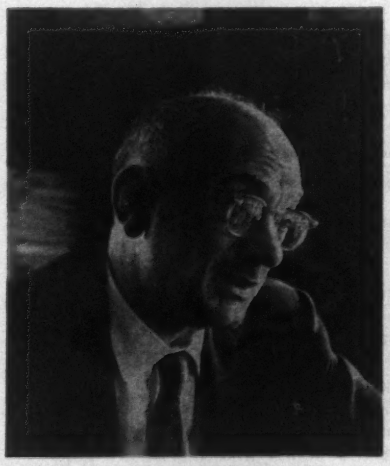
• **Technical control**—Mr. Feld's answer to these problems is a technical control bureau—a private organization set up to qualify projects for construction liability and damage insurance. The policies would cover all risks of total or partial damage that might occur during construction and for a 10-year period after completion of the work.

In Europe, where it has been instituted for nearly 30 years, the system works much like fire insurance in this country—with the technical control bureau analagous to the National Board of Fire Underwriters and its affiliated state organizations.

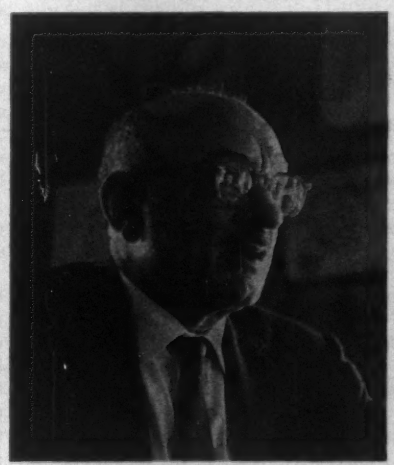
Mr. Feld first observed technical control in action ten years ago attending lectures on prestressed concrete at the University of Ghent by the late Prof. Gustave Magnel, one of the original promoters of technical control. Its success in Europe convinced Mr. Feld that technical control could raise design and construction standards and reduce failures in the U. S.

In France and Belgium the Code Napoleon, still in effect in both countries, holds architects and builders legally responsible for damages resulting from total or partial structural failure in building for 10 years following their completion. After World War I, severe judicial definitions of partial damage aggravated builders' woes. When they turned to insurance, the results were less than happy. Lacking reliable ways of calculating risks, insurance brokers wrote a few haphazard contracts, which proved unsound.

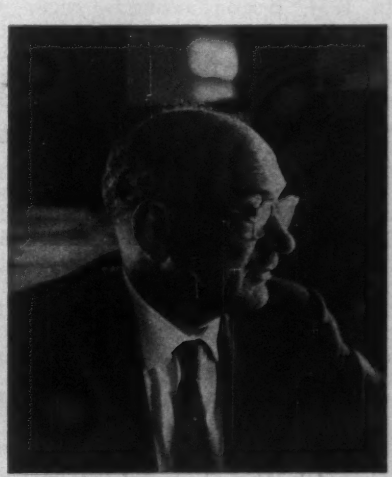
(Please turn the page)



new materials have multiplied problems . . .



missing today is the 'shadow of the boss' . . .



the industry needs vitamins, not pills."

"OWNERS are maintenance conscious today; many call me during the planning stage."

Meanwhile, serious construction accidents in Europe during the 1920s led to intensive investigations of ways to control construction practices. Public agencies in France and Belgium created special commissions to study the problem. Some European governments established administrative controls, but the bureaucratic obstructions of this policy slowed construction progress.

The technical control bureau appeared on the scene as a practical way of resolving the various problems. It maintains standards of public safety, and, as a private organization, it avoids governmental control. Moreover, it minimizes the risks of companies dealing in construction insurance.

In 1934, Belgian architects, engineers and contractors created the Bureau de Controle pour le Securité de la Construction en Belgique (SECO). At about the same time two similar technical control bureaus appeared in France. Insurance companies finance their activities.

SECO, which employs 30 full-time engineers, is concerned only with new construction. It prefers to be brought into a project during preliminary planning stage, and it stays on the job until the building is turned over to the owner. During this time SECO reviews and approves structural design, choice of materials, field practices, soil testing and other key phases of construction. On the basis of SECO's certificate of approval insurance companies underwrite the 10-year risk insurance.

Fees, paid either by the owner or the builder, vary between 0.8% on large projects and 1½% on the smaller ones.

Insurance premium on a job certified by SECO ranges from 0.45% to 1%. The policy covers the owner for such items as re-housing and replacement costs in event of collapse; it also covers third party liability.

An indication of technical control's effectiveness is the performance of structures of two Brussels fairs. At the 1935 Fair, not supervised by SECO, a pavilion collapsed before the opening. At the 1958 Brussels World Exhibition, 100% under SECO control, no accidents occurred. And this project included many buildings of advanced design (ENR Sept. 26, 1957, p. 36).

• **Why technical control?**—Why would technical control be better for the U. S. construction industry than improving existing practices? Why not provide for more rigorous shop and field inspection of formwork construction, etc.?

Because the building industry needs vitamins rather than palliative pills, answers Mr. Feld. Nothing less than a fresh approach can cure its ills. According to Mr. Feld, a technical control bureau would accomplish these things:

- Unify the responsibility for control of a project.
- Make more efficient use of trained personnel in the construction field.
- Raise standards of the testing lab by abolishing price competition.
- Provide a hard monetary motive to insure good designs and construction in conformance with it.
- Provide a technical staff trained to see projects with fresh eyes and unbiased viewpoint.

By the same principle that subcontractors with many jobs can make better use of reinforcing barsetters, technical control could make more efficient use of engineering personnel, mainly by organizing schedules more efficiently than is presently possible. It would centralize a trained pool of technical talent.

Present field inspection practice is often inefficient. Interruption of a design engineer's office routine for a field trip to inspect reinforcing-bar placing is good for the particular job. But it makes inefficient use of personnel. Under technical control a trained inspector could be stationed on the job or visit the job on a coordinated schedule.

Even more important than better personnel use, according to Mr. Feld, is the monetary motive. The fact that the technical control bureau represents insurance companies that have to pay off in cold cash in event of formwork collapses or structural failure provides a strong motive for strict control of the project. Mr. Feld cites the high standards of inspection maintained by fire insurance companies to sharpen this point.

Moreover, the funds to finance thorough field supervision by technical control would already be allocated, whereas too often on jobs today these funds are hopelessly inadequate. "Periodic inspection visits" by the consulting engineer, provided for in many specifications, are ineffectual. Existing policies present too much temptation for the engineer to overlook professional responsibilities of field supervision.

• **Modern problems**—Mr. Feld says that today's owners, more conscious of maintenance costs than in former years, anticipate problems by calling him in during the design phase. Formerly, they waited until the trouble began.

Today's problems, though they include the old problems that traditionally plague construction, more often involve new materials and combinations of materials. Examples:

- Brickwork failure from excessive shortening of concrete columns with lightweight aggregate.
- Precast prestressed concrete, especially where the designer specifies work done with "watchmaking" precision.

In New York City the problem of brick cracking and spalling off the walls of lightweight-concrete frames has been quite common. In one case in which he was consulted, Mr. Feld says that the glazed surface facing brick developed such high compressive stress under the shortening of the lightweight concrete columns that it actually popped out when workmen began removing

cracked brick. The glazed brick, fired under high temperatures, has an elastic modulus about 2 to 3 times that of the lightweight concrete. Several buildings on Manhattan, faced with this "self-cleaning" glazed brick developed the same symptoms of bulging out from the wall surface, cracking and pulling masonry anchors out from their slotted inserts in the concrete.

This problem of lightweight concrete shrinkage is difficult. Specifying standard weight concrete for columns to limit their shortening presents bad alternatives. If you specify monolithic casting of the column and the floor, you have the problem of blending the lighweight concrete with the standard concrete. This requires a degree of precise coordination beyond ordinary construction practice. If you separate the pours of column and floors then you have alternating lengths of standard and lightweight concrete in the column.

Because of reduced load factors in some new materials, Mr. Feld believes that structural engineers must control them through every phase of their manufacture and handling. Unless he controls the choice of concrete aggregates, prestressing strands, reinforcing, assembly, manufacture, transport, handling and erection, a structural engineer should not design prestressed concrete structures, according to Mr. Feld.

To illustrate why he adopts this strict position, Mr. Feld cites a project where some 60-ft-span double tee sections sagged 9 in. when erected. The only explanation of this weird behavior was that excessive vibration during a 300-mi journey caused bond slippage of the tendons and consequent loss of prestress.

• **Obstacles**—Unfortunately, today's conditions are hardly ideal for instituting new kinds of construction insurance in the U.S. The two domestic companies originally writing professional liability policies are generally disenchanted with this type of insurance, which covers professional engineers for errors of negligence and omissions in design work (ENR Dec. 5, 1957, p. 166). Both have taken financial beatings, and one has withdrawn from the field.

As chairman of the Construction Control Committee of the New York City Association of Consulting Engineers, Mr. Feld has received no encouragement from two associations of insurance companies that he approached with the proposal for establishing structural failure and collapse insurance in the U.S. But the enduring success of technical control in Europe, where it has worked out happily for all concerned, has convinced Mr. Feld that the system is sound. He hasn't given up yet.

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Case Report: DULLES AIRPORT

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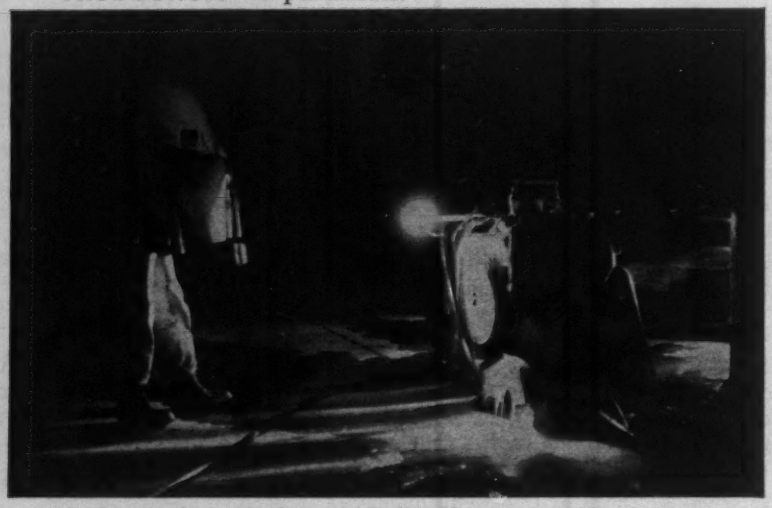
AGGREGATE — Trap Rock.

SAWING OPERATION — Diamond blades for all sawing.

TYPE OF DIAMOND — Engelhard Hanovia natural diamond abrasive.

DIMENSIONS — Depth of cut varies with depth of slab. 15″ concrete is cut 3″ x ¼″. 8″ and 9″ slabs are cut 2″ x ¼″. Transverse joints are cut on 25′ centers.

PRODUCTION — 6′ per minute.



At the new, largest-in-the-world Dulles Airport now under construction, durable smooth-riding runways requiring a minimum of maintenance are mandatory for efficient, uninterrupted service. The big jets will really pound those runways and unless a precision jointing method is used, the slabs could not withstand the punishment. That's why the specifications for both transverse and longitudinal joints call for diamond blade sawing.

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For detailed information and field-use reports from state highway officials and contractors, write to Engelhard Hanovia, Inc., for Report #101.

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Obituaries

Joseph P. Johansen Sr., 67, retired architect with the Louisville, Ky., firm of Thomas J. Nolan & Sons.

Albert R. McLaurin, 70, founder of A. R. McLaurin and Son, general construction firm of Fayetteville, N.C.

Harry J. O'Brien, 70, senior partner in the architectural firm of O'Brien, Phillips & Associates of Warren, Ohio.

Frank J. Rosaio, 31, president of Rosaio Construction Co. and Point Breeze Construction Co., both of Wilmington, Del.

Harold R. Moorhouse, 58, executive vice president and treasurer of Arthur G. McKee & Co., Cleveland construction and engineering firm. He had recently taken charge of the company's international operations.

Joseph A. McNeil, 56, founder and president of J. A. McNeil Co., Inc., Los Angeles general contractors. A one-time chairman of the California Contractor's Licensing Board, he was also a past president of the Southern California Chapter, AGC.

Roger B. Stone, 73, retired chief engineer of the Pennsylvania Turnpike Commission. He directed the initial survey of the turnpike route beneath the mountains of western Pennsylvania and supervised part of the construction work in that area. Prior to joining the state government, he was involved in construction of the Philadelphia subway system and worked for Canadian railroads.

Frank J. Snider, 77, an Elizabethtown, Ky., road contractor and former president of the Kentucky Association of Highway Contractors.

Norman C. McEachren, 75, president of the construction firm of W. N. McEachren and Son of Toronto. He was responsible for developing a large part of that city and its suburbs.

John H. Lyons, 70, general president of the iron workers international union. Head of the union since 1949, he was also a vice president of the AFL-CIO Building and Construction Trades and Metal Trades Departments.

Gerald A. Monroe, 70, partner in the Cleveland firm of Wm. A. Monroe, Inc. and builder of hundreds of homes in the Cleveland area during the past five decades.

Ralph B. Bencker, 78, a retired Philadelphia architect.

Lewis McDonald, 77, retired vice president of Chicago Bridge & Iron Co. He taught civil engineering at the University of Illinois after receiving his degree there. He joined Chicago Bridge and Iron Co. in 1910.

Hugh P. Duffill, 63, a Pembroke, Mass., consulting engineer. A graduate of MIT, he was on the faculty at Lincoln Technical Institute for several years and was also associated with the Illinois division of highways, the New Central Railroad, Stone & Webster Engineering Corp., and the Portland Cement Co. before opening his own firm. During the war he was a Coast Guard Officer in charge of security for the port of Boston.

Robert O. Derrick, 71, retired president of Robert O. Derrick & Associates, Detroit architects. He designed the Federal Building in Detroit and the Henry Ford Museum in Dearborn.

Ambrose J. Byrne, 63, retired division engineer for the city of Syracuse, N.Y., He worked for the city for 43 years.

Robert C. Jacob, 91, retired president of Juniata Construction Co. of Allentown, Pa.

Adolph Johnson, 80, former president of Adolph Johnson and Son Co., Youngstown, Ohio, general contractors.

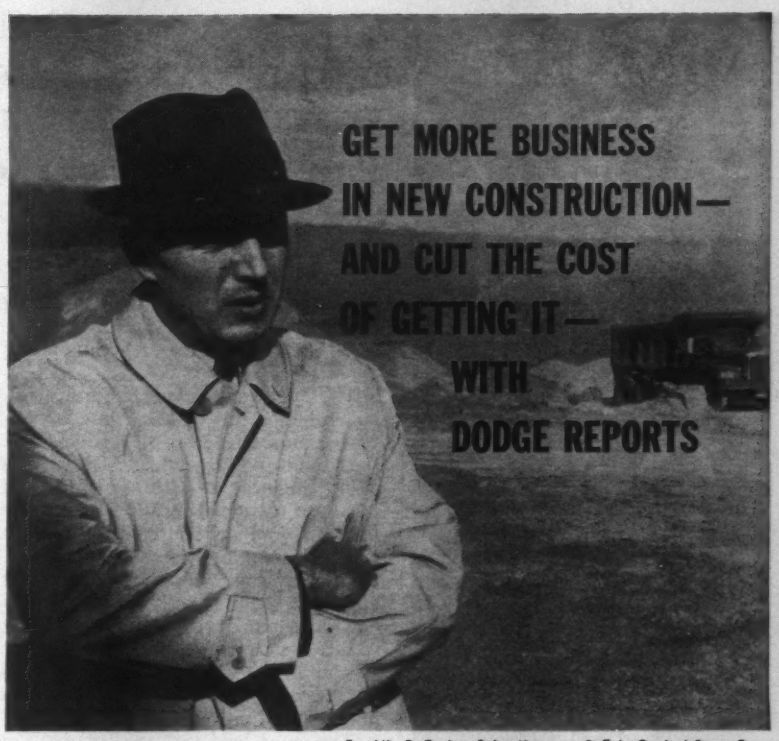
Joseph Dimeo, 68, president of the Dimeo Construction Co. of Providence, R.I. He was a past officer of the Rhode Island chapter, AGC.

Elkins R. Young, 94, formerly an engineer with the Austin Co., Cleveland engineering and construction firm.

Ernest E. Caldwell, 59, a civil engineer with the Indiana State Highway Department since 1929.

William Vurpillat, 83, a retired Hermosa Beach, Calif., builder and sometime traveling medicine man.

Harry Fagin, 62, president of three Cleveland firms, Fagin Builders Inc., Glenville Heating Co. and Meadow Lane Village Apartments Inc. He entered the construction industry at the age of 15 as a plumber's assistant. Mr. Fagin was a former trustee of the Cleveland Home Builders Association and a past president of the Progressive Master Plumbers Association.



Franklin P. Taylor, Sales Manager, Buffalo Crushed Stone Co., a Unit of Houdaille, Bowmansville, N. Y.

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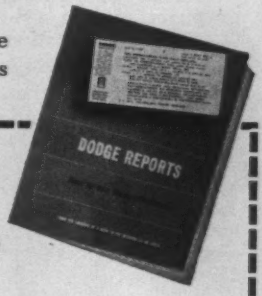

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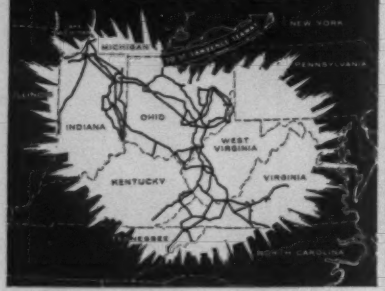

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Engineer Was Not an Architect

Local statutes may prohibit a professional engineer from assuming the title of practicing architect.

That was the decision of a Maine court which found a licensed professional engineer guilty of appropriating the title of architect.

The engineer had erected and maintained upon the building housing his professional quarters a sign which bore the following legend, "Melvin W. Beck, Engineer & Architect". He had not been registered by the Maine State Board of Architects in compliance with the provisions of Maine Law (R.S. c. 81). This conviction was affirmed on appeal.[1]

The engineer contended that the statute was unconstitutional in that it was an arbitrary and unwarranted interference with the right of a citizen to pursue a lawful livelihood.

The court held that the law was not unconstitutional. Quoting from the case of Laughlin v. City of Portland, 111 Me. 486, 489, 90 A. 318, 319, 51 L.R.A., N.S., 1143, it stated: "The power of the judicial department of the government to prevent the enforcement of a legislative enactment, by declaring it unconstitutional and void, is attended with responsibilities so grave that its exercise is properly confined to statutes that are clearly and conclusively shown to be in conflict with the organic law, * * *."

The appellate court, in commenting on the distinction between architects and engineers, stated: "Professional engineering and architecture in the Legislative estimation are patently regarded as separate species of the engineering genus and such a judgment seems objectively valid. While categorically an engineer, the architect—without disparagement toward the professional engineer—is required to demonstate that he possesses and utilizes a particular talent in his engineering, to wit, art or aesthetics, not only theoretically but practically, also, in coordination with basic engineering. R.S. c. 81 prescribes that an engineer verify that he has such special talent to a sufficiency cultivated degree before he may publicly solicit patronage as an architect.

"Professional engineering and architecture are not mutually separable and can never be completely disassociated. They are overlapping vocations. Nonetheless the Legislature in reason was justified in not regarding them as coextensive but as occasioning individualized attention for the public weal."

(1) State v. Beck, 165 A. 2d 433, Supreme Judicial Court of Maine, Oct. 4, 1960.

Unsworn Statement Voids Lien

Where local laws require a sworn statement of claim to establish a mechanic's lien, failure to file such a statement voids the lien.

Ohio law, for example, requires a party claiming a mechanic's lien to present a sworn statement of the claim.

In a recent case, a subcontractor furnished labor and material for a prime contractor and submitted an unsworn statement of claim to the contractor. The trial court held that no valid lien existed. The reason, the court said, is that the statement did not comply with the statutory requirement.

The action to foreclose the lien was dismissed and the dismissal was affirmed on appeal.[1]

The appellate court stated: "The courts have held that where certain statements are required to be furnished, compliance therewith is a condition precedent to the perfection of the lien and unless complied with the contractor has no right of action or lien against the owner, part-owner or lessee. There is no doubt from the record that the only statement presented to the prime contractor by the defendant-appellant was an unsworn statement and since the facts were in dispute as to the availability of the prime contractor we cannot say that the trial court was wrong as a matter of law. There was not a compliance with the provisions of the statute. (Citing many cases)." **(1) Dealers Lumber & Coal Co. v. Peter A. Marchi, Inc., 170 N.E. 2d 257, Court of Appeals of Ohio, January 12, 1960.**

These summaries of court decisions are prepared by I. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts; Legal Guide for Contractors, Architects and Engineers;* and *Legal Cases for Contractors, Architects and Engineers.*

Bids Close for Powerhouse at Arkansas Dam

Installation prices for government supplied electric generating equipment, highlights this $3,297,672 powerhouse and switchyard job at Greers Ferry Dam, Ark. Work is for the Corps of Engineers.

Paul Hardeman, Inc., Stanton, Calif., squeezed 0.2% under Red River Builders (a joint venture made up of Morrison-Knudsen Inc., Boise, Ida., Johnson, Drake & Piper, Inc., Minneapolis, Minn., and Henry J. Kaiser Co., Oakland, Calif.), but is 28% under the high of seven bidders.

Portland Cement will conform to federal specifications SS-C 192d, type II. Cement content is 3 to 6.5 bags per cu yd of concrete.

Minimum wage rates include: skilled labor $3-$3.90/hr; and common, $1.60-$2.00/hr.

The bidding includes:

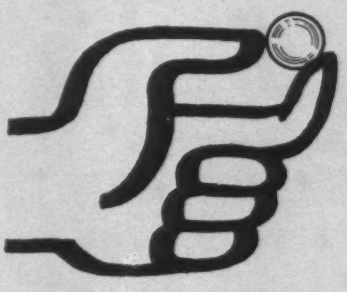
1C Paul Hardeman, Inc., Stanton, Cal.	$3,297,672
2 Red River Bldrs. (Morrison-Knudsen Co., Inc., Boise, Ida.; Johnson, Drake & Piper, Inc., Minneapolis, Minn.; Henry J. Kaiser Co., Oakland, Cal.)	3,305,382
7 Chas. H. Tompkins Co., Washington, D. C.	4,563,330
EE U. S. Army Engineers	3,716,538

Bids: 9-6-61 Items	Unit	Quantity	Unit Prices 1C	2
Cofferdam, maint & removal	ls	job	$47,210	$88,000
Access rds, maint	cal mo	30	1,592	1,000
Excavation, common	cy	20,000	3.42	1.80
trench	cy	700	5.56	5.00
rock	cy	11,100	5.55	4.70
Drilling, close line	sf	4,200	1.18	0.60
drain holes, 3"ϕ	lf	1,650	3.96	6.00
Tile, porous, semi-circular	lf	280	4.05	5.00
Drill & grout, for erect bay fl anchors	lf	1,600	4.28	2.00
Surfacing, crushed rock	cy	600	9.06	10.00
Riprap, dumped	cy	1,800	12.18	2.50
Rdwy, parking, drainage, except pwrhs rd	ls	job	20,420	25,000
Conc, generator & erection bays,				
below el 291.75	cy	14,000	34.85	27.00
above el 291.75	ls	job	180,500	310,000
service bays	ls	job	105,842	170,000
tailrace ret wall & pving	cy	5,750	23.08	21.00
switchyd fdn & control cable duct bank	ls	job	19,262	33,000
misc for parking area & fence	ls	job	5,656	12,000
lightweight	ls	job	570.00	1,000
porous	ls	job	788.00	1,700
floor finishes	ls	job	19,380	27,500
P cmt	bbl	34,200	6.06	.....
& pozzolan, tp F, P cmt	bbl	27,800	.....	4.50
pozzolan, tp F	t	950	.....	13.00
Reinf, bar & fabric	lb	1,332,000	0.138	0.13
Waterstops, copper	ls	job	10,640	8,700
Screens, assembly deck	ls	job	1,600	3,300
Steel & met work, misc	lb	101,000	1.00	0.50
Pwrhs, roof frame	ls	job	85,750	33,000
Liner, sta serv penstock & draft tube dischg	ls	job	10,450	12,000
Gate & guide, main unit draft tube	ls	job	39,426	45,000
Transformer & crane rails	ls	job	16,864	20,000
Handrail, steel pipe	ls	job	4,100	6,000
Treads, safety	ls	job	2,100	1,500
Piling, steel	lf	2,600	7.60	13.50
Fence, switchyard	ls	job	3,740	3,300
Building const	ls	job	215,152	290,000
Air cond equip	ls	job	36,662	60,000
Air duct, sheet met, incl insulation	ls	job	51,688	48,000
Pipe, unwatering	ls	job	14,926	19,000
Drain sys, build	ls	job	31,260	37,000
Piping, san drain	ls	job	8,590	8,000
piezometer & flowmeter	ls	job	958.00	1,000
turbine & draft tube vent	ls	job	3,284	5,700
& tailwater ga well	ls	job	3,644	5,700
head gate interlock	ls	job	446.00	500.00
treated water	ls	job	6,260	5,700
Piping, raw water	ls	job	35,370	36,000
insulating oil	ls	job	23,450	20,000
lubrication oil, & governor	ls	job	7,640	5,500
compressed air	ls		10,270	8,800
carbon dioxide	ls	job	3,716	5,000
automat sprinkler	ls	job	5,742	12,000
insulation	ls	job	6,500	5,000
Fix, plumbing; coolers, water; fount, drink; still, water; heater, electric water	ls	job	8,494	3,000
Pumps, unwatering	ls	job	6,472	6,000
sump, unwatering	ls	job	3,042	1,800
drainage	ls	job	4,908	3,000
Water purification equip	ls	job	3,314	6,700
Water spray, auto, fire protect equip	ls	job	5,180	4,500
Sew disposal equip	ls	job	7,804	8,000
Recording transm, tailwater level	ls	job	1,544	1,000
Oil purification units	ls	job	9,040	28,000
transfer pumps	ls	job	2,126	2,500
storage tanks	ls	job	16,716	17,500
tanks, liquid level ga	ls	job	1,544	4,000
flowmeters	ls	job	2,700	1,000
Air comp, sta	ls	job	10,226	8,000
governor	ls	job	3,386	2,300
Damper, flood duct	ls	job	324.00	600.00
Maintenance shop equip	ls	job	19,290	20,000
Valve, sta serv draft tube	ls	job	500.00	3,200
Gate hoist, draft tube	ls	job	4,738	12,500
Lifting beam, tube gate; latches, support beams, f, i, & test	ls	job	2,552	5,400
Lift, equip	ls	job	25,274	3,500
Jib crane	ls	job	6,560	700.00
Filters, oil	ls	job	2,264	700.00
Cond, gal steel (except buried), flex met, and nonmagnetic met	lb	83,000	0.77	1.00
plastic coat, buried	lb	2,100	0.88	0.90
Electrical accessories, misc	ls	job	6,454	3,000
Wire & cable, insulated	ls	job	53,130	63,500
Grounding sys, pwrhs	ls	job	9,184	15,000
switchyard	ls	job	10,630	17,300
Cable trays	ls	job	13,296	11,000
Lgt, sys for pwrhs	ls	job	64,500	32,300
switchyard, parking area & rdwy	ls	job	10,864	12,000
Tel sys, & equip, PAX	ls	job	7,048	10,000
sound power	ls	job	668.00	3,500
Connects, high voltage switchyard & transf	ls	job	16,654	7,000
Panelboards, 480-v	ls	job	1,612	2,300
Turbines, main	i ls	job	174,339	200,000
sta serv, governor & generator	ls	job	32,336	9,000
Generators, main, unload, haul, handle, store, & paint	ls	job	55,360	16,000
Fdn bolts, sole plates, rotor erect pedestal floor plates, flowmeter, for main generator	ls	job	13,640	3,500
Governors, main	i ls	job	10,978	10,000
Crane, bridge	i ls	job	8,534	20,000
Transf, power & circuit breakers, oil	i ls	ob	11,714	7,800
Switches, disconnect, & lgt arresters	i ls	job	4,978	5,000
Busses, main generator, & switchgear	i ls	job	11,262	16,000
Switchboards, control, & associated equip.	i ls	job	8,774	24,000
Switchgear, sta serv; power distr centers; bus, met encl	i ls	job	7,482	22,000
Carbon dioxide equip	i ls	job	11,360	4,200
Steel, switchyard, erect	ls	job	10,020	13,000
Oil, instl, lubricate, insulate	ls	job	1,616	1,200
Battery, sta	i ls	job	818.00	600.00
Powerhouse Road				
Excavation, uncl	cy	46,000	1.01	1.80
Subbase, course	cy	610	8.10	3.50
Aggr, stab base course	cy	1,560	7.35	3.50
Bit prime coat	gal	3,170	0.50	0.70
cold-mix surface course	t	535	59.20	18.00
nat for single bit surfacing	gal	830	0.50	1.20
Aggr, cover for single bit surfacing	cy	40	24.45	24.00
Rail, guard	lf	1,175	3.04	6.00
Post, delineator	ea	16	81.50	12.00

all items furnish and install unless otherwise noted
i install only
Completion date: April 1964
Liquidated damages: $400 per day

ENR Constr. Cost Index (1913=100) 20-cities avg.—854.01

DOWN TO FUNDAMENTALS



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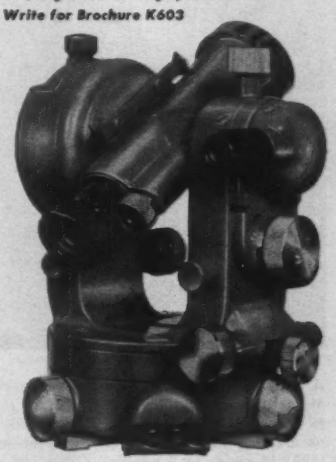
FUNDAMENTAL SURVEYING EQUIPMENT
120 Grand St., White Plains, N.Y.

DKM1 Ten Second Theodolite (with optical micrometer)

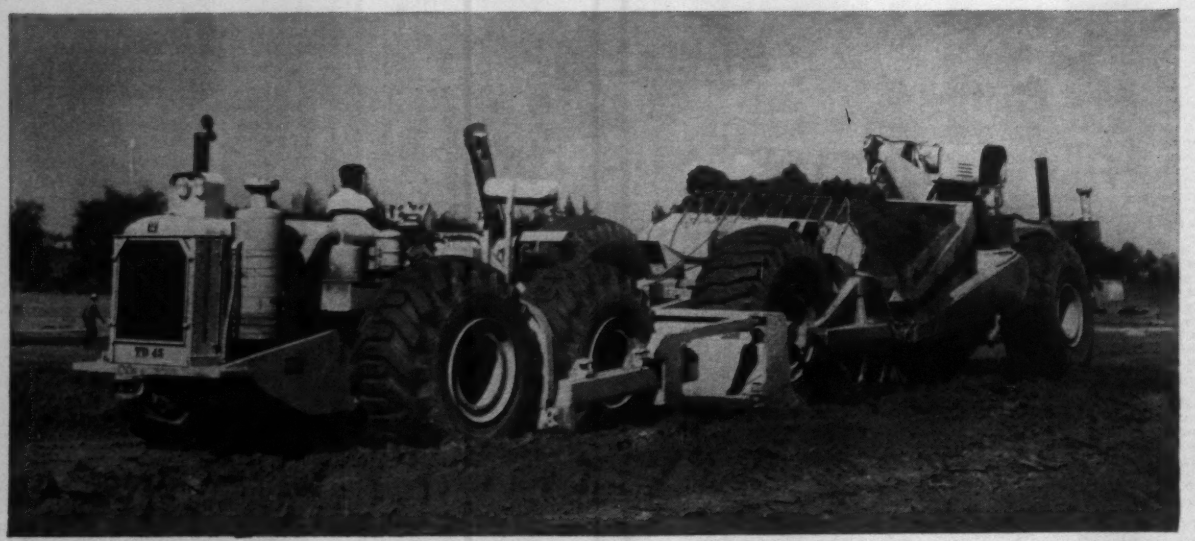
for land surveying, triangulation, big construction and engineering operations spot checking.

- *20x telescope. AR coated optics.*
- *Each reading is the arithmetic mean of two diametrically opposed points of the circle.*
- *Fast direct reading to 10 sec. Estimation to 1 sec.*
- *Average working accuracy—3-4 sec.*
- *Only 6 lbs. 7" high, incl. case.*

Write for Brochure K603



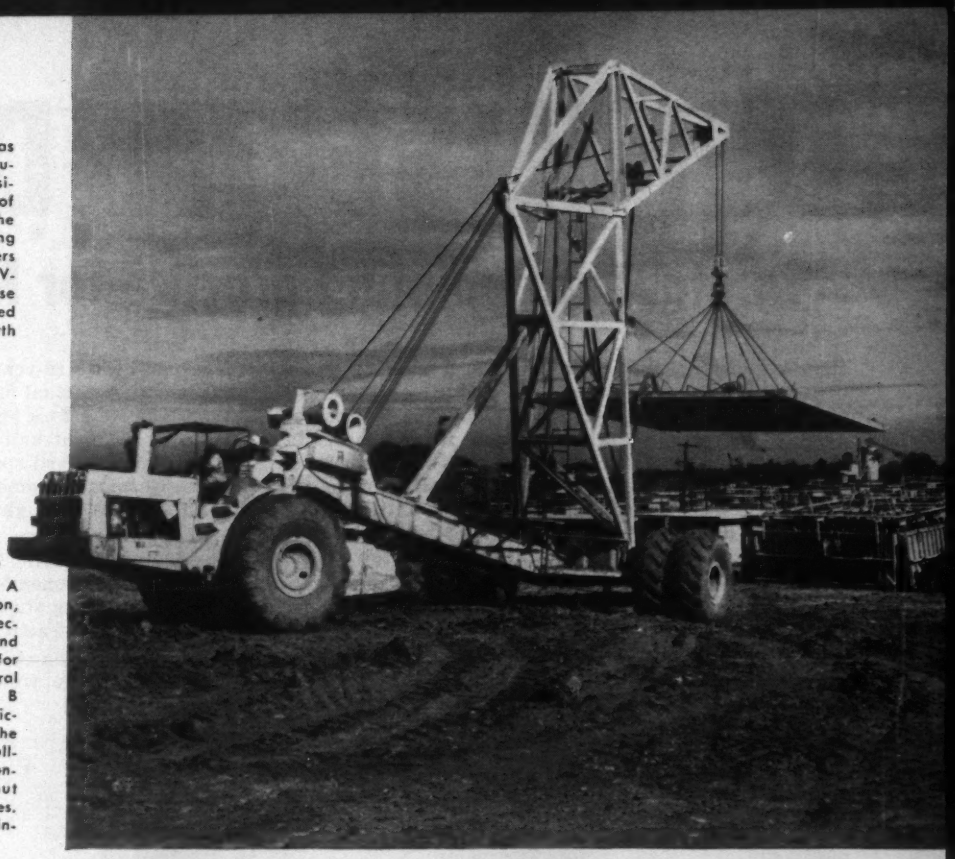
12 LW machines speed



A fast earthmoving pace — was set at Minillas when A. Valles Montequin, of Hato Rey, brought in his LeTourneau-Westinghouse fleet to level land for industrial development. 5 B Tournapulls each moved an average of 18.3 m^3 (24 yd^3) of hard clay, completed 1290-m (4232-ft) cycles in 5 minutes. Other LW machines at the site included 2 rubber-tired Tournatractors and an LW 660 grader.

Complete information on LeTourneau-Westinghouse scrapers, tractors, graders, and hauling equipment will be sent promptly on request.

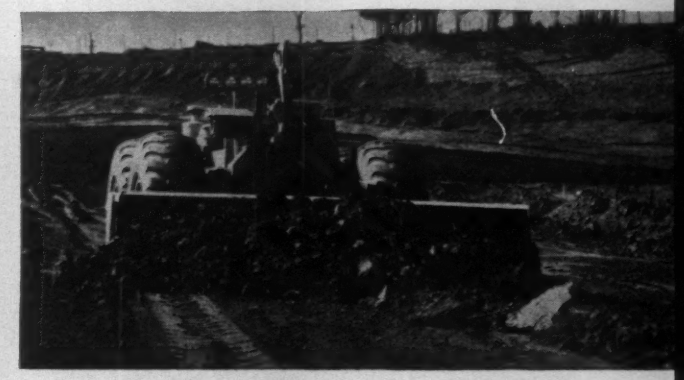
3300 m^3 (4320 yd^3) per shift was production average for 3 LeTourneau-Westinghouse B Tournapulls leveling residential sites at Bayamon (a suburb of San Juan), Puerto Rico. Developer of the 500-lot subdivision — Hato Rey Building Co. Inc. — worked the big LW scrapers on 900-m (2950-ft) cycles. The 430-hp V-Power "B" gets big loads fast because its 29-yd Fullpak scraper bowl is angled at only 1° when loading — lets earth flow in almost horizontally.



Built 4000 homes in one project. A big job, but Ibec Housing Corporation, of Rio Piedras, erected the homes in record time using modern methods and equipment. Concrete walls and roofs, for example, were precast in one general work area. Then, the firm used its B Tournapull prime-mover with 27-metric-ton crane to lift, carry, and position the sections. With LW "electrics" Tournapull-Crane operator has *smooth, positive* control — handles heavy objects without subjecting them to damaging stresses. Electric controls are also easiest to maintain, are not affected by weather.

industrial, residential development

At industrial development site, 160-hp LW 660 grader, owned by A. Valles Montequin, maintained the fill area, and also kept scraper haul-roads in high-speed condition. LW grader features that help to increase production include: 8-forward-speed transmission with 4 reverse and 3 optional creeper gears; big 160 cm (63") blade circle; super-strong one-piece frame; full-floating drive axles and anti-friction power train, and "handy-reach" power controls.



Between push-loading assignments, Montequin's versatile Tournatractors handled dozing. "Go-anywhere" LW tractors complete more work over a wider area with almost no tractor-moving expense. In addition to the electric-control LW tractor shown, LeTourneau-Westinghouse offers you a Tournatractor with hydraulic blade control. This unit is equipped with a 218-hp V-Power diesel engine, has 4 speeds forward to 29.6 kph (18.5 mph), 10 kph (6.2 mph) reverse.

Tournapull, Fullpak, Tournatractor—Trademark Reg. U.S. Pat. Off. LA-2421-DCJ-2wc

LW

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILL.
A Subsidiary of Westinghouse Air Brake Company *Where quality is a habit*

DEFENSE-IN-DEPTH

...a standard painting practice for New York State

Here's an example of Defense-in-Depth painting on the Crescent Bridge, spanning the Mohawk River, just north of Albany, N. Y. Eighteen months ago, the bridge was given three coats of paint containing Basic Lead Silico Chromate—the remarkable pigment that builds corrosion inhibition, weather resistance and durability into *every* coat. Basic Lead Silico Chromate insures anti-corrosion protection all the way out from primer to intermediate to finish, plus life-extending durability all the way in from finish to intermediate to primer. That's what "Defense-in-Depth" means. The savings are outstanding any way you look at it.

New York was one of the earliest enthusiastic users of Basic Lead Silico Chromate paint . . . backed up by National Lead's 10-year exposure tests with its own field experience on actual bridges. Result? On November 28, 1958, The New York State Department of Public Works, Division of Construction, officially issued a "Paints and Painting" standard specification calling for Basic Lead Silico Chromate pigment in *all* coats of rust-inhibitive paint systems for highway structures.

Today, paints pigmented with *M50*® Basic Lead Silico Chromate are proving their worth in states from Maine to California. Remember another big advantage too . . . *M50's* low tinting strength allows high pigmentation in a wide variety of attractive shades.

For information on how *M50* Basic Lead Silico Chromate can help you, write or call National Lead Company.

M50® an oncor® Pigment...
A Development of National Lead Company

General Offices: 111 Broadway, New York 6, N.Y.

Materials Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR Issues for OTHER PRICES:

- Iron & Steel Products, Pipe: Last, Oct. 12; Next, Nov. 16.
- Wood Products, Glass, Explosives, Chemicals: Last, Oct. 19; Next, Nov. 23.
- Clay Products, Limes, Plaster, Paint, Roofing: Last, Oct. 26; Next, Nov. 30.
- Wage Rates, Building Board, Lath, Insulation: Last, Nov. 2; Next, Nov. 30.

CEMENT, AGGREGATE, READY MIXED CONCRETE - F. O. B. CITY

Item	Quantity	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	†Toronto
Cement, Port., bulk	CL	bbl.	$3.09a	$3.91a	$3.50cf	$4.53ap	$4.02ag	$4.34c	$3.89	$3.34a	$4.39a	$3.79agq	$3.97a	$3.71e	$4.17a	$3.65b	$4.20a	$4.01¢ae	$4.62bj	$4.09a	$3.85c	$3.75ag	$2.96de¢	$3.84t
paper	"	"	4.32a¢	4.42a	4.43c	5.83ip	4.52ag	4.90c	4.77¢	3.84a	4.89a	4.29a	4.30a	4.15c	4.68a	4.17b	4.71a	4.51¢ae	5.65bjk	4.59a	4.42c	4.47¢a	3.26¢de	4.00i
mortar	"	"	3.64a¢	3.56a	.....	4.90mp	4.15g	4.32c	4.19¢ae	3.72a	4.89	3.88a	4.52a	4.65c	4.26a	3.97b	3.77a	3.63¢e	5.00bjl	4.24a	4.86c	4.65a	3.31¢de	4.00i
Gravel, 1½"	"	ton	2.25n#	2.80a#	2.65ns	3.00qss	3.78¢e	2.29¢cu	2.25ae	2.55¢a	1.95	2.50¢abm	.....	2.56¢at	2.70¢ae	2.61b	.....	1.95¢a	2.68¢aqv	3.50¢as	2.02	4.25¢bm	1.90¢a	2.40
¾"	"	"	2.50n#	2.80a#	2.65ns	3.00qss	3.78¢be	2.34¢cu	2.25ae	2.60¢a	2.15¢	2.50¢abm	.....	2.71¢at	2.70¢ae	2.61b	3.20bk	1.95¢a	2.68¢aqv	3.50¢as	2.02	4.25¢bm	2.15¢a	2.40
Sand	"	"	2.00n#	2.25a#	1.30ns	3.00qss	4.13¢be	2.44¢cu	1.75ae	1.65¢	1.42¢b	2.16¢abm	1.70¢a	2.41¢at	1.60¢ae	2.16¢b	2 30bkw	1.55¢a	3.08¢aqv	2.50/3.50¢as	2.12	4.25¢bm	2.40¢a	2.05
Crushed stone, 1½"	"	"	3.10s	2.85a#	2.25s	1.75qss	3.95¢be	2.55¢cu	2.70fy	2.57	.....	2.80¢abm	2.10¢a	2.41¢at	4.00¢ae	.....	2.85blbb	2.00¢a	2.00¢aqv	1.75js	2.17	4.50¢bm	1.90¢	2.40
¾"	"	"	3.10s	2.90a#	2.25s	1.85qss	3.95¢be	2.74¢cu	2.70fy	2.77	3.00¢x	2.80¢abm	2.10¢a	2.46¢at	4.00¢ae	.....	2.85blbb	2.30¢a	2.00¢aqv	1.75js	2.17	4.50¢bm	2.15¢	2.40
Crushed slag, 1½"	"	"	3.90r	2.05a#	1.95d	.....	2.25¢e	1.80u	2.30¢ff	.....	.....	3.15aqaa	.....	.....	.....	1.95d	.....	2.25¢a	2.10w	1 80	.....	.....	2.00	2.40
¾"	"	"	3.90r	2.00a#	2.05d	.....	2.25¢e	1.80u	2.30¢ff	.....	.....	3.50aqaa	.....	.....	.....	2.05d	.....	2.35¢a	2.10w	1.85	.....	.....	2.00	2.40
Concrete block, 8"x8"x16"																								
Sand/gravel	TL	ea	0.19o	0.18a	0.19	0.24o	0.26¢e	0.19o	.....	.....	0.25	0.24u	0.22a	0.145f	0.20q	0.25r	0.276no	.....	0.22rx	0.26¢o	0.24	0.288s	0.20	0.26
Lt. wgt. agg	"	"	0.225o	0.18a	0.19	0.305ao	0.26¢be	0.25ao	0.24f	0.255	0.27ao	.27¢au	0.27c	0.225	.....	0.25	0.32bo	0.20	0.22rx	0.32¢co	0.28c1	0.384cs	0.28t	0.30cu
Concrete, ready-mix'r		cy	13.00g	13.50ou	14.75q	15.00q	13.00–13.50e	15.00gr	16.95u	11.50x	11.90	15.50eaa	13.50	12.46hlx	14.55f	14.25o	17.60ay	14.65z	16.15o	13.65/14.10q	13.25cw	14.70j	10.80ek	11.75q

Delivered. * F.o.b. plant. ** Add 4% sales tax ## Add 2% intrastate sales tax. R Revised. † Plus 8% Mun & Prov tax.

CEMENT: *a Less 10¢ disc. 15 days. *b Less 2% disc. 15 days. *c Less 10¢ disc. 10 days. *d 10¢ disc. 20 days. *e Truckload lots. *f Fob mill, add $14.58 to $21.31 per car switching charges. *g fob mill + freight. *h LCL. *i Less 2% disc. 10 days. *j Truck lots, fob yard. *k 100 bag lots. *l over 150 sacks. *m Sold in bags only. *n Less 5% disc. 30 days. *o Plus 50¢ for Sat. del. *p 5–8 ton truckload. *q F.o.b. mill *r 50 cy & over *s In bags & bbl. Only. *t min. 7 tons

SAND, GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons up. *d Less 5¢ disc. 10 days. *e Less 2% disc. 10th. *f Less 2% disc. 15th. *g Less 5% for cash. *h Less than 5 tons. *j F.o.b. quarry. *k Barge lots asd. *l F.o.b. scow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *o F.o.b. yard. *r less 5% disc. 15th. *s Less 2% disc. 10 days. *t Less 10¢ disc. 10 days. *u Less 5¢ disc. 10 days. *v Less 2% disc. 15 days. *w Less 10¢ disc. 15 days. *x Incl. 35¢ switch charge. *y F.o.b. dock. *z 5–8 tons. *aa Less 5% disc. 15 days. *bb Less 2% 25th of month

CONCRETE BLOCK: *a Cinder. *b Waylite. *c Haydite. *d Celocrete. *e 5¼ x 8 x 12 in. *f 8 x 4 x 16 *g F.o.b. truck at job. *i F.o.b. plant San Rafael. *m F.o.b. yard. *n 8 x 8 x 18. *o Less 2% disc. 10 days. *p Less 2% disc. 10th, *q Less 5% disc. 10th. *r Less 2% disc. 15 days. *s Less 2% disc. cash. *t Siporex, 7 x 8 x 18. *u Less 5% disc. 10 days. *v Less 12% disc. 15th.

READY MIXED CONCRETE: *a 6 cu yd or over del. Man. *b 25 cu yds or more. *c 10–100 cy. *d 1–3 mi. zone add 15¢ for ea. add'l 1-mi. zone. *e 3,000 lb comp. *f 2,500 lb. comp., less 5% disc. 30 days. *g Less 25¢ disc. 15 days. *h Less 50¢ for cash. *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 6% mun. & prov. tax. *l 1:2½:3½ base price. *m F.o.b. yard. *n Plus escalator clause. *o Less 2% disc. 15 days. *p Less 50¢ disc. 15 days. *q Less 2% disc. 10 days. Add 50¢ per zone. *r 2000 wgt. *s Less 5% disc. 10 days. *t Incl. 50¢ heating. *u Less 2% disc. 15th. *v Sat. del.+50¢. *w 10–100 cy. *x Del in zone 20-B. *y less 25¢, 10 days. *z less 1% in 30 days. *aa 6 bag mix

MILL PRICES FOR BULK CEMENT: Subject to 10¢ discount, 15 days. For paper bags add 50¢ per bbl., not refundable. *Prices guaranteed through December 31, 1961*

Richard City, Tenn	$3.55	Bath, Pa	$3.50	Northampton, Pa	$3.50	Leeds, Ala	$3.40	Howes Cave, N. Y.	$3.50	Oswego, N. Y.	$3.60	Green Bay, Wis	$3.60
Clinchfield, Ga	3.55	Lesley, Pa	3.50	Universal, Pa	3.60	Duluth, Minn	3.60	Muskegon, Mich	3.55	Cleveland, O	3.65	Ironton, O	3.65
Kingsport, Tenn	3.55	Buffington, Ind	3.55	Waco, Tex. (+ 10 tax)	3.35	Hudson, N. Y.	3.50	Saginaw, Mich	3.60	Alsen, N. Y.	3.50	Montreal, Canada (a)	2.80
West Des Moines, Iowa	3.65	Independence, Kan	3.35	Giant, S. C.	3.55	Alpena, Mich	3.50	Wyandotte, Mich	3.60	Toledo, O	3.60	W. Winfield, Pa	3.60
Nazareth, Pa	3.50	Hannibal, Mo	3.55	Steelton, Minn	3.60	Detroit, Mich	3.60	Buffalo, N. Y.	3.55	Milwaukee, Wis	3.60	Security, Md.	3.50

*a 350 lb. bbl.

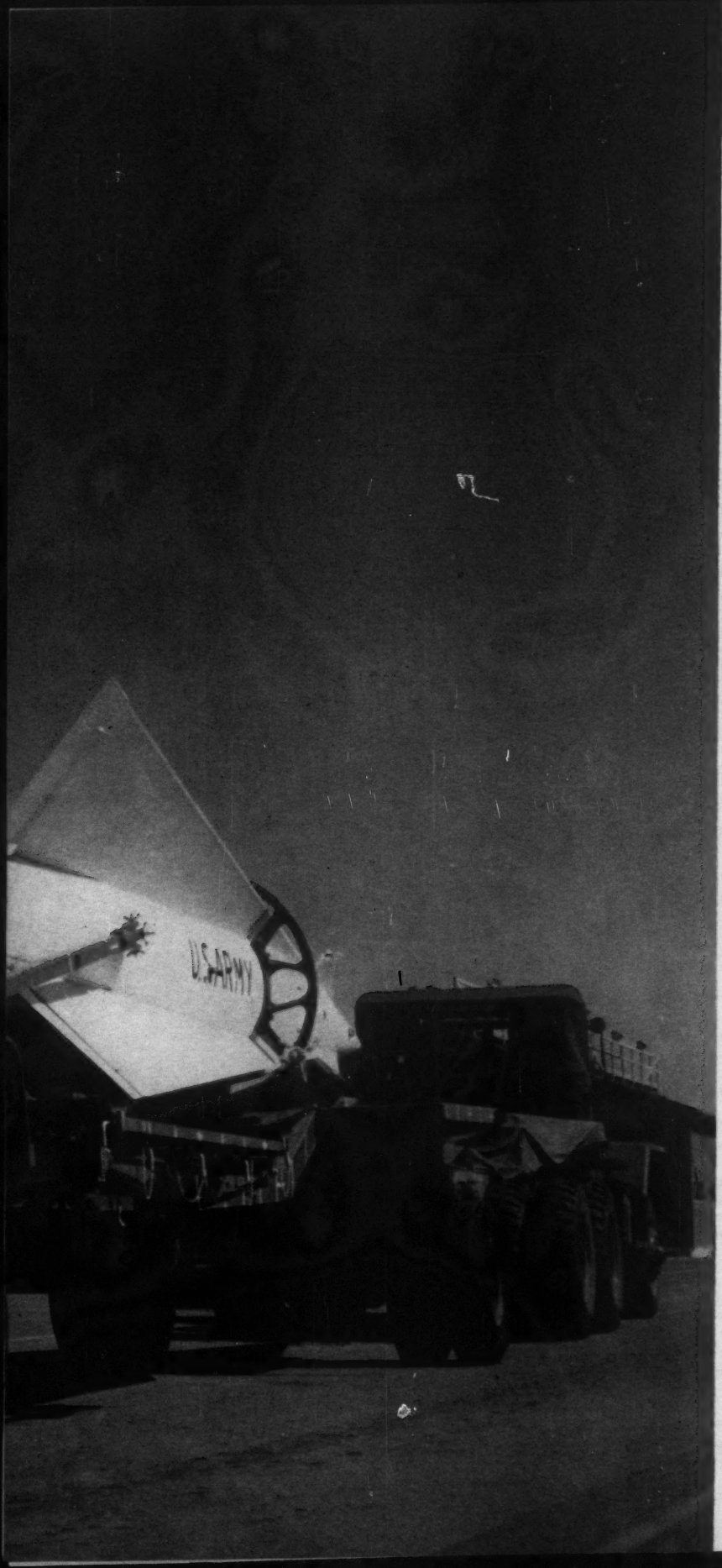
PAVING BRICK, BLOCK, ASPHALT, ROAD OILS - F. O. B. CITY

Item	Quantity	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
Paving brick, block-																								
Brick, 3"x4"x8½	CL	M	.....e	.....e	.....e	.....e	$150.00¢ab	.....e	.....e	.....e	.....e	.....e	.....e	.....e	.....e	.....e	.....e	.....e	$60.00k	.....e	.....e	.....e	.....e	.....e
Granite, 4"x4"x8"	q	M	.....e	.....e	$66.00i	.....e	95.00¢a	.....e	89.50	40/80	62.00a	$114.00	.....e	.....e	.....e	.....e	.....e	.....e	95.00n	.....e	$70.00	.....e	.....e	$120.00¢f
Wood, 3½" 16 lb	...	sy	.....e	.....e	.....e	.....e	3.95/4.00aj	.....e	6.30	.....e	.....e	.....e	.....e	.....e	$3.73	e	$3.70f	.....e	6.35n	.....e	.....e	.....e	.....e	4.50f
Asphalt, paving																								
Tank car	CL	ton	$0.1182W	$21.00	25.12 O	$22.00apS	22.00b	$26.00SU	24.00tA	26.90	.....	31.00¢	$18.75cl	$18.00dmx	23.70	$20.00e	22.90mO	0.21u	31.20isv	$19.74	21.50gdd	$24.00s	$30.50n	38.90
Drummed	CL	gal.	0.1220W	.....	25.69	46.00aps	32.00b	.....	.....	46.35	.....	.....	.....	.....	.....	.....	67.83mO	.....	.....	21.65	41.00gdd	47.00h	43.60n	59.01ee
Asph. binders, fluxes																								
Tank car	CL	gal.	0.1182W	0.9i	0.1069	22.00avS	20.40bv	26.00ffv	24.00tvA	.1138	.....	31.00¢	18.75cv	18.00dvx	23.70	20.00ev	22.90vtO	0.21u	31.20isv	.1825f	21.50gkvdd	33.00vscc	0.167n	0.2135ee
Drummed	CL	gal.	0.1220W	0.18i	0.1093	46.00avS	30.40bv	.....	.....	.1983	.....	.....	.....	.....	.....	.....	67.83vtO	.....	.....	.1825	41.50gkvdd	38.50	0.211n	0.2367w
Asph. cutback, MC																								
Tank car	CL	ton	0.1222W	0.9i	0.1163w	0.105awF	.10bwH	0.1165twAF	0.1050wSU	30.50	.....	30.24wl¢	.0825cwJ	19.50dKx	0.105w	0.095ew	10.16uF	0.095U	0.1403¢S	.09f	22.50gNdd	25.50KE	17.80nuE	0.18wee
Drummed	CL	gal	0.1258W	0.18wE	0.1188Ow	0.22awF	.18bwH	.....	.....	52.45	.....	.....	.....	.....	.....	.....	29.62uF	.....	.....	.092fw	46.50gNdd	.....	22.20nuE	0.235
Road oil, tank car	CL	gal	.....	0.95i	0.1006O	0.14aOR	.08b	0.109	.....	.1100	.....	27.84v	.06751c	18.50dvaa	0.95	0.085eB	.....	0.095U	0.14¢S	.165f	23.25gvWdd	28.75hvY	0.155n	0.191w
Asph. emul. RSI																								
Tank car	CL	gal.	0.1288W	0.10i	0.1069	0.15OR	.....	0.1265	.....	0.1138	.....	0.152	.10	21.40jXv	0.132bb	0.095eBL	10.15u	.....	0.1403i	.18250	23.50gvXdd	25.80hvX	0.242n	0.204Zee
Drummed	CL	gal	0.1327W	0.19i	0.1093O	.....	.....	.....	0.21A	0.1983	.....	0.29	.....	.1842)Xv	.....	0.1905eB	29.81u	.....	.....	.30	.455gXdd	49.80hrvX	0.27nX	.26Zee

PAVING BRICK & BLOCK: *a Less 2% disc. 10th. *b 3 x 3½ x 8. *c 2¼ x 8 x 4. *d Truckload lots. *e Not used. *f 2" interior 6 lb tr. *g Less $1/Mdisc. 15th. *h 2" tr. 8 lb. *i 3 x 3½ x 8½. *j 2½", 6 lb. tr. *k Used. *l Redshale. *m Pine; oak $6.57. *n Truck del. *o Less $1 M disc. 15 days. *p Used: $40; new: $80. *q Lots of 50M.

ASPHALTS: *a F.o.b. refinery, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segundo. *e F.o.b. Baton Rouge. *f F.o.b. Hartford, Ill. *g F.o.b. refinery, Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery, Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50-110 penetr. *l Less than 100 penetr. *m 40/300 penetr. *n F.o.b. refinery, Montreal. Fed. tax included; add 6% for mun. & prov. *o Drums not avail. Shipped in steel bbl. *p 60/70 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 150/300 penetr. *u Per 100 gal. *v Per ton. *w Per gal. *x Also tank trucks *y F.o.b. Oakland. *z F.o.b. Edmonds. *A F.o.b. refinery, Cleveland. *B F.o.b. Destrehan, La. *E RC. *F Also RC. *G Also MS *H RC 0-5 incl. *I MC 4. *J MC, RC $0.095. *K MC 3, 4, & 5. *L MS. *M MC 1-5, RC 1-5, $0.0918. *N MC 3. *O Truckload. *P F.o.b. refinery, Atlanta. *Q F.o.b. Eldorado, Ark. *R Delivered within 50 mi. *S Less 2% disc. 10 days, net 30. *T Less 1% disc. 10 days. *U F.o.b. refinery. *V Less 2% disc. 15 days. *W SC 2. *X RS 1. *Y SC 1. *Z Incl. 10% Sales Tax. *aa SC 3, 4, & 5. *bb RS 3. *cc In used drums. *dd less disc of $1 ton. *ee 45 Imp. gal. drums *ff 80–150 penetration

Steel
U.S.ARMY



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Transport . . . for the Nike Hercules missile. A trailer built of Lukens "T-1"* brand steel ■ Specified for "its high strength characteristics," Lukens "T-1" provides a yield strength of 100,000 psi—3 times that of structural carbon steel. It permits the design of stronger, yet lighter equipment. A big advantage for mobile missile trailers—or any steel structures where high strength and weight saving are important considerations. Bridge members. Earth moving machinery. Dam penstocks. Scroll casings. And Lukens "T-1" is a readily weldable material—in the field as well as in the shop ■ Our technical staff is immediately available for consultation on designing with Lukens "T-1"—or selecting other structural steels from Lukens' broad line of carbon and alloy plates. Phone collect: Manager, Application Engineering, 41D Services Building, Coatesville, Pa. Or, write for Bulletin 405, "Lukens 'T-1' Steel."

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Bids Asked—Low Bidders—Contracts Awarded—

NEW ENGLAND

BUILDINGS—BA

▲ **Mass., Framingham**—BA 12/4—Town, Supt. Schools, 49 Lexington St., JUNIOR-SENIOR HIGH SCHOOL, Winch Park, A St. $5,000,000. Extended date. M. A. Dyer Co., 24 School St., Boston, archt. CD 10/9/61.

BUILDINGS—LB & CA

Presidential Constr. Corp., 101 Park Ave., New York 17, N. Y., CA $5,200,000, 16 story, 72 ft. 5 in. x 227 ft. 9 in. APARTMENT, 111 Park St., at George St., NEW HAVEN, CONN. Presidential Management Corp., 180 S. Broadway, White Plains, N. Y. Kahn & Jacobs, 2 Park Ave., New York 16, N. Y., archts. Bardos & Ettinger, 118 E. 28 St., New York 16, N. Y., mech. engrs. Garfinkel & Marenberg, 100 W. 42 St., New York 36, N. Y., struct. engrs. CD 6/18/58, under University Towers, Inc., as owner.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **N. Y., New York**—BA 11/28—New York City Housing Auth., 299 Broadway, Zone 7, (1) fdns. and general contract (2) heating and ventilating (3) electrical work and (4) plumbing for Proj. NYS-102, CHELSEA HOUSES, W. 26 St., 9 Ave., W. 25 St. and Elliott Houses Proj., excluding northeast corner of this area, also constr. within existing ELLIOTT HOUSES PROJ. bordering Chelsea Houses consisting extension to CHILDREN'S CENTER in Bldg. 1 and ALTERATIONS to HUDSON GUILD BLDG., Manhattan Boro. Plans deposit $75. CD 8/24/61.

BUILDINGS—SLC

▲ **Pa., Pittsburg**—Equitable Life Assurance Society No. 3 Gateway Center, soon lets contract OFFICE and UNDERGROUND PARKING FACILITIES $5,000,000. Curtis & Davis, 2475 Canal St., New Orleans, La., archts. CD 6/19/61.

LOW COST...MORE USABLE SPACE...WINS PIER 40 JOB FOR PRESCON PRESTRESSED CONCRETE

Competitive bidding with alternates saved more than a quarter million dollars over conventional steel framing in labor and material costs in building New York City's newest and largest public pier. The superstructure's basic framing is of prestressed girders post-tensioned by the Prescon System. Plans called for simple, single and double cantilever girders. The largest were over 100 ft. in length weighing 72 tons. A number of the girders were prestressed in stages to gain advantage of additional dead load of the beams and slab.

The contractor cast the more than 350 girders adjacent to columns to simplify erection and eliminate overloading of the deck with heavy moving equipment. Tendon delivery was coordinated with casting, which averaged 3 girders per day.

Whether you are designing massive pier girders or a delicate shell roof, the Prescon System of prestressing increases freedom of design and choice of cast-in-place, lift slab, or precast construction. If you are not acquainted with the wide range of examples of prestressed concrete using the Prescon System, the Prescon representative will be glad to show them to you.

Owner: NYC Dept. of Marine and Aviation • Architect & Engineer: Roberts & Schaefer Co., Inc. • General Contractor: Corbetta Construction Co., Inc. • (All of New York City) • Photographs courtesy of Corbetta Construction Co., Inc.

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BUILDINGS—LB & CA

▲ **Arthur A. Kober Co., Inc.**, 9 Union Ave., Bala Cynwyd, Pa., CA Est. $5,000,000, Stage I, HAC MALL SHOPPING PLAZA, AMHERST, N. Y. Forest City Enterprises, 16903 St. Clair, Cleveland, O. BA 10/10. CD 9/20/61.

▲ **William L. Crow Constr. Co.**, 101 Park Ave., New York 17, N. Y., CA Est. $14,000,000, 21 story Country Squire MOTOR INN, entire block W. 51 to W. 52 Sts., Broadway and Seventh Ave., NEW YORK, N. Y. Country Squire Motor Inns, 300 Park Ave., New York 22, N. Y. CD 5/23/61.

▲ **Housing Enterprises, Inc.**, 22 W. 48 St., New York 19, N. Y., Owner Builds. 19 story APARTMENT, 61-75 East End Ave., NEW YORK, N. Y. Robt. L. Bien, 342 Madison Ave., New York 17, N. Y., archt. Farkas & Barron, 5 Beekman St., New York 38, N. Y., struct. engrs. M. P. Zacharius Assocs., 34 W. 34 St., New York 1, N. Y., mech. engrs.

▲ **Smithson Constr. Corp.**, P.O. Box 234, Stratford, Conn., CA Est. $3,500,000, 17 story DRAKE HOTEL ADDN., 440 Park Ave., NEW YORK, N. Y. Webb & Knapp, Inc., 383 Madison Ave., New York 17, N. Y. for Zeckendorf Hotels Corp. John H. Barry, 385 Madison Ave., New York 17, N. Y., archt. CD 7/27/59.

▲ **Bechtel Corp.**, 485 Lexington Ave., New York, N. Y., CA $15,000,000, Catalytic Cracking PLANT FACILITIES, MARCUS HOOK, PA. Sun Oil Co., 1608 Walnut St., Phila., Pa. CD 10/5/61.

SOUTH

HEAVY CONSTRUCTION—BA

▲† **Kentucky**—BA About 2/1—U. S. Eng., P.O. Box 1070, Nashville 2, Tenn., 1,000 lin. ft. COFFER DAM; 430 ft. x 173 x 175 ft. high above draft tube fdn. POWER PLANT; 7,100 ft. x 45 ft. maximum height DAM; concrete spillway section, 816 ft. x 150 ft. high to service bridge deck with tainter gates each 55 ft. x 50 ft. high prestressed concrete service bridge; 1,740 ft. single track steel and concrete RAILROAD BRIDGE across the powerhouse, spillway and lock, Barkley Dam Proj., Lyon and Livingston Counties, CIVENG-40-058-62-12. Over $10,000,000. Plans deposit $10. CD 10/3/61, under Kentucky and Tennessee.

HEAVY CONSTRUCTION—LB & CA

▲ **KENTUCKY and INDIANA**—Commonwealth Ky., Dpt. Hys., Frankfort, Ky., Bids opened 10/27, BRIDGE, **Allied Structural Steel Co.**, 20 N. Wacker Dr., Chicago, Ill., LB $6,825,640 (4 bidders), bridge superstructure and lighting 0.473 mi. over Ohio River north-south Expressway between Louisville, Ky., and Jeffersonville, Ind., I 64-9(3)136, SP 56-798, Jefferson Co., Ky., and Floyd Co., Ind. CD 10/11/61.

BUILDINGS—LB & CA

▲ **Robert McKee General Contractor, Inc.**, 2708 Inwood Rd., Dallas, Tex., LB $4,770,000, (9 bidders), APARTMENT and PARKING GARAGE, 4th and York Sts., LOUISVILLE, KY. F. W. Drybrough, South 5 St., Louisville 2, Ky. BA 10/23. CD 9/22/61.

MIDDLE WEST

HEAVY CONSTRUCTION—LB & CA

▲ **MICHIGAN**—State Hy. Dpt., 732 Mason Bldg., Lansing, Zone 26, Bids opened 10/25, ROADS,

Mich.—**Canonie Constr. Co.**, U. S. 31 and M 43, South Haven, Mich., LB $4,130,889, 7.1 mi. I-94 from Cotton Rd. southwest of New Baltimore north to Macomb-St. Clair County line about 2 mi. north, incl. interchanges at M-29 (23-Mile Rd.), M-19 (New Haven Rd.) and 26-Mile Rd., grade separation at County Line Rd. and twin bridges over Salt River about 1 mi. northwest of New Baltimore, Macomb Co.

Mich.—**Cooke Contracting**, 1116 Penobscot Bldg., Detroit, Mich., **C. J. Rogers, Inc.**, 14836 Grand River, Detroit, Mich., and **Jutton-Kelly Co.**, 13240 Alber Ave., Dearborn, Mich., LB $3,358,170, 1.8 mi. Southfield Freeway from Schoolcraft Ave. north to McNichols Rd., incl. vehicular bridges at Grand River, Fenkell, Puritan and McNichols and pedestrian bridge at Tournier, also pumphouses at Fenkell, Puritan and McNichols, Wayne Co.

BUILDINGS—LB & CA

▲ **Hali Constr. Co., Inc.**, 22 W. Gay St., Columbus 15, O., Owner Builds, $7,000,000, 370 HOMES, Kar-Mel Village, Karl Rd., north of Morse Rd., COLUMBUS, O. James Braden, c/o owner, archt. CD 8/9/60.

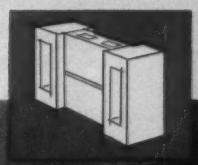
▲ **S. Simon Constr. Co.**, 1463 Warrensville Center Rd., Cleveland 21, O., Owner Builds, $10,000,000, $2,000,000, first year (five to six year program) fifty-five 2 story brick, 450 suite APARTMENTS, Euclid Ave. and E. 276th St., EUCLID, O. Marvin Rukin, 13947 Cedar Rd., Cleveland 18, O., archt.

▲ **Bee Gee Builders & Assocs.**, 5927 Addison St., Chicago, Ill., Owner Builds, $6,000,000, 194 unit APARTMENT, Lee and Higgins Rd., Rosemont Ave., CHICAGO, ILL. Frey & Walsh, 4740 N. Harlem Ave., Chicago, Ill., archts.

▲ **George A. Fuller Co.**, 111 W. Washington St., Chicago, Ill., CA $35,000,000, 35 story OFFICE, Washington and Dearborn Sts., CHICAGO, ILL. Washington-Dearborn Properties, Inc., c/o Arthur Rubloff & Co., 100 W. Monroe St., Chicago, Ill. Skidmore, Owings & Merrill, 30 W. Monroe St., Chicago, Ill., archts.

(Continued on page 68)

Great new things are shaping up in concrete block



Architect Marcel Breuer, New York, alternated hollow-core units and standard 4" x 8" x 16" concrete blocks to create this striking masonry wall. PHOTO COURTESY NATIONAL CONCRETE MASONRY ASSOCIATION.

Atlas Masonry Cement provides the right mortar

Concrete blocks in a range of new designs . . . colors . . . and textures are being used to create unusual and distinctive effects in masonry construction. For structural or decorative use, indoors and out, the economical concrete block is now a major design element in today's building plans. And to lay up these new concrete masonry units, Atlas Masonry Cement continues to be the preferred basic material for mortar. It helps produce a smooth, workable mix . . . assures a stronger bond . . . gives weathertight joints that are uniform in color . . . complies, too, with ASTM and Federal Specifications. For information, write: Universal Atlas Cement, Dept. M, 100 Park Avenue, New York 17, N. Y.

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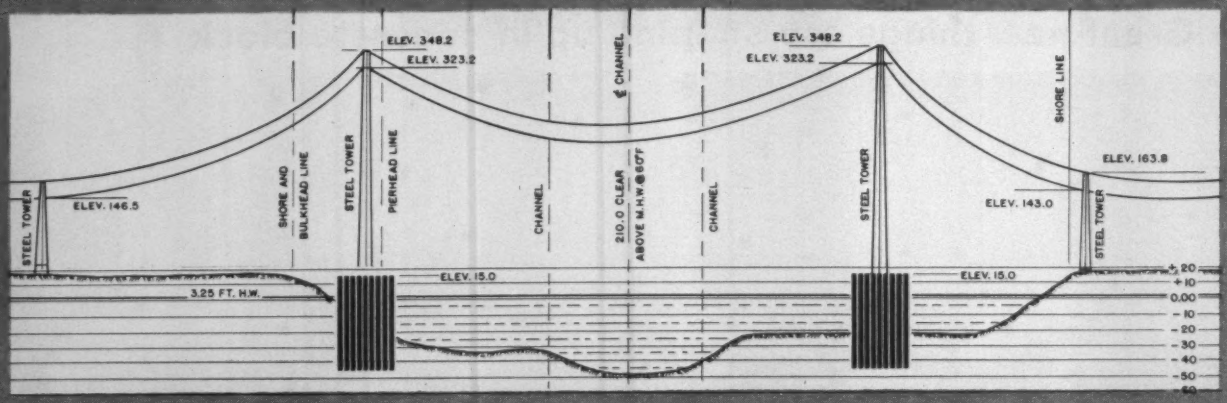


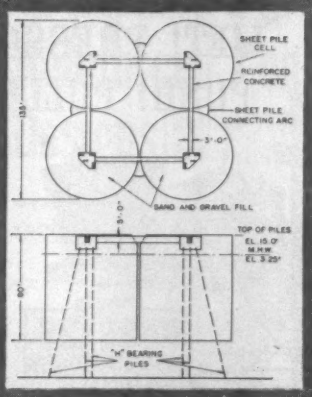
Ships Ahoy . . . steel islands ahead

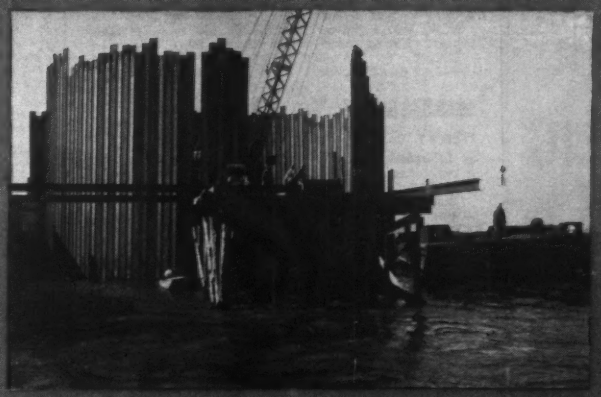
The Delaware River is 4,200 feet wide at the spot where Philadelphia Electric Company wanted to build its new 220,000-volt transmission-line crossing near Chester, Pennsylvania. Clearances for air and river traffic limited sag, restricting the span to 2,800 feet, which meant off-shore suspension towers and danger from heavy river traffic.

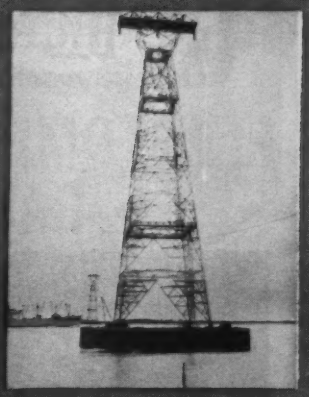
Philadelphia Electric engineers came up with this novel solution: build their own islands with steel sheet piling cells, filled with sand and gravel. These piling islands would offer good basic protection to the towers and also provide a working platform for construction and maintenance.

Each island consists of four 67'-diameter cells interconnected by short arc walls. Tower legs are individually supported on clusters of four steel

for maximum strength and durability







H-Piles driven to 90-ton bearing on rock. A total of 1,850 tons of USS steel sheet piling in sections MP-101 and MP-102 were required.

This foundation was designed on the basis that a cell could be destroyed without endangering the tower, although the islands are well out of the ship channel as shown by the plan at the upper left.

In support structures like this, steel sheet piling and H-Piles do the very best job, and at the lowest cost. Wherever you are building, you can get any type of piling when you want it from United States Steel. Just call our nearest office. For technical information write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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- Resistant to ozone and ultra violet exposure.
- Dries tack-free in 4 to 6 hours . . . cures in 30 to 60 days.
- Available in four colors: white, natural, grey, and aluminum.
- Fibre tube features no-flow device.

WRITE FOR COMPLETE INFORMATION

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16 KIMBALL ST. • ELGIN, ILLINOIS

(Continued from page 64)

▲ **Sam Minskoff & Sons,** 521 Fifth Ave., New York 17, N. Y., Owner Builds, **$16,000,000,** 28 story, precast quartz aggreg. panel facade Detroit Bank Trust Co. OFFICE, Fort St. and Washington Blvd., DETROIT, MICH. CD 7/27/61.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲ **Colorado** — BA 1/2 — Metropolitan Suburban Water Users Assn., (Boettcher & Co., 828 17 St., Denver, Colo. and John P. Elliott, 1637 1st National Bank Bldg., Denver) Homesteak Tunnel, to divert 75,000 acre ft. water from Eagle River through 5.3 mi. tunnel to tributary of Arkansas River, through pipelines over Trout Creek Pass into streams to carry water into Denver and Colorado Springs, $40,000,000. John P. Elliott, 1637 1st National Bank Bldg., Denver, Colo., engr. CD 10/14/59.

HEAVY CONSTRUCTION—LB & CA

▲† **Morrison-Knudsen Co., Inc.,** 411 West 5th St., Los Angeles, and **Paul Hardeman, Inc.,** 1079 Dale St., Stanton, Calif., CA **$7,852,000,** constr. TITAN MISSILE LAUNCH FACILITIES, Little Rock Air Force Base, LITTLE ROCK, ARK. U. S. Eng., Ballistic Missile Constr. Office, 5651 W. 96th St., Los Angeles, Calif.

▲† **Guy H. James Constr. Co.,** 4901 North Sewell St., Oklahoma City, Okla., and **J. H. Beckman Constr. Co.,** 3631 West 14 St., Sioux Falls, S. D., LB **$7,531,000,** est. $8,088,725, (12 bidders), WILSON DAM and RESERVOIR CIVENG-23-028-62-15, KANSAS. U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo. BA 10/26/61. CD 10/17/61.

▲† **Martin K. Eby & Assocs.,** 610 North Main St., Wichita, Kan., CA **$6,460,650,** CONSTRUCTION TITAN MISSILE LAUNCH FACILITIES, McConnell Air Force Base, WICHITA, KAN. U. S. Eng., Ballistic Missile Constr. Office, 5651 West 96th St., Los Angeles, Calif. CD 4/27/60.

▲† **Armstrong & Armstrong & J. H. Ryan & Co., Inc.,** P.O. Box 1873, Roswell, N. M., LB **$5,752,200,** est. $5,413,771, (6 bidders), concrete DAM and SPILLWAY, Proctor Reservoir, Leon River, CIVENG-41-443-62-8, TEXAS. U. S. Eng., 100 West Vickory, Fort Worth Tex. BA 10/31/61. CD 10/3/61.

BUILDINGS—LB & CA

▲ **Fischer & Frichtel, Inc.,** 8703 St. Charles Rock Rd., Overland 14, Mo., Owner Builds, **$7,500,000,** first year $2,500,000 (3-4 Yr. Program), 750 RESIDENCES, ROADS, WALKS, SEWERS, etc., Subdivision on Hy. 21, Mattis School, Kerth and Butler Hill Rds., MEHLVILLE (ST. LOUIS 29 P.O.), MO. CD 6/21/61.

▲ **G. L. Tarlton Contg. Co.,** 5500 West Park, St. Louis 10, Mo., CA Approx. **$5,000,000,** est. $4,000,000, SUPERSTRUCTURE 10 story brick, concrete, steel, etc. STOCKHOUSE, 13 St. between Arsenal and Pestalozzi Sts., ST. LOUIS, MO. Anheuser-Busch Inc., 721 Pestalozzi St., St. Louis 18, Mo. BA 9/29. CA 10/27. CD 9/19/61.

▲ **Kaiser Engineering Div. Henry J. Kaiser Co.,** Kaiser Center, Oakland, Calif., CA Est. **$9,600,000,** 1,400,000 bbl CEMENT PLANT, near HELENA, MONT. Permanente Cement Co., (Sub. Henry J. Kaiser Co.), Kaiser Center, Oakland, Calif. CD 10/9/61.

▲ **Al Cohen Constr. Co. & Saul Davidson,** 1801 W. 13th Ave., Denver, Colo., CA Est. **$5,000,000,** SKYLINE OFFICE PLAZA, incl. Safeway Regional Headquarters, 2 story, bsmnt., 50,000 sq. ft. office bldg., 15 story tower, DENVER, COLO. Davco Investment Co., 1801 W. 13th Ave., Denver, Colo. W. C. Muchow, 3911 East Exposition Ave., Denver, Colo., archts.

FAR WEST

BUILDINGS—SLC

▲ **Calif., Fremont**—Argonaut Realty Co. Div. General Motors Corp., General Motors Bldg., Detroit, Mich., soon lets contract AUTOMOBILE MANUFACTURING PLANT, Fremont Blvd. and Eastshore Hy. $8,000,000. John S. Bolles, 14 Gold St., San Francisco, Calif., archt. Chin & Hensolt, 121 2nd St., San Francisco, Calif., engrs. CD 2/13/61.

HEAVY CONSTRUCTION—LB & CA

▲ **Fluor Corp.,** 2500 Atlantic Bldg., Los Angeles, Calif., CA **$7,060,200,** constr. TITAN MISSILE LAUNCH FACILITIES, Davis-Montham Air Force Base, TUCSON, ARIZ. U. S. Eng., Ballistic Missile Constr. Office, 5651 West 96th St., Los Angeles 45, Calif. CA 4/27/60.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, ROAD,
R. A. Westbrook, Inc., Morrison-Knudsen Co., Inc., & Richard N. Moseman, 6431 Elvas Ave., Sacramento, Calif., CA **$6,079,939,** 5.5 mi. freeway US Hy. 99 in and south of Fresno, Fresno Co. BA 10/18, CA 10/27. CD 10/23/61, under LB.

▲ **Vido Artukovich & Sons, Inc.,** 11155 Rush St., El Monte, Calif., CA **$4,469,910,** est. $4,237,700, INTERCEPTOR SEWER, Contr. No. 1, sewage collection, treatment and disposal sys., SAN DIEGO, CALIF. City, Purchasing Agent, Rm. 161, Civic Center Bldg., San Diego 1, Calif. BA 10/18, CA 10/26. CD 10/23/61, under LB.

BUILDINGS—LB & CA

▲ **Perini Corp.,** 255 California St., San Francisco, Calif., CA $4,471,100, RESIDENCE HALLS, Unit No.

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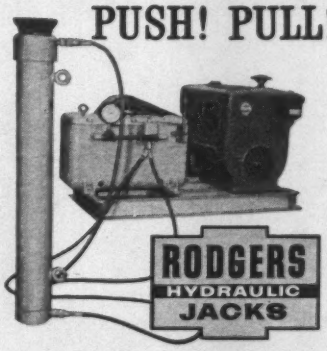

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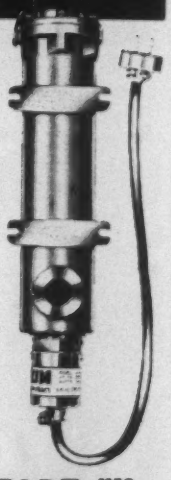

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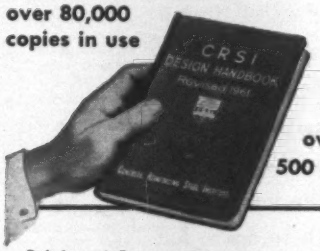

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3, Berkeley Campus, BERKELEY, CALIF. Regents of the University of California, 141 University Hall, Berkeley 4, Calif. CA 10/23. CD 10/10/61, under LB.

▲ **Kaiser Engineering Div., Henry J. Kaiser Co.,** Kaiser Center, Oakland, Calif., CA Est. $8,800,000, 2,700,000 bbl. KILN at Cushenbury Cement Plant, Lucerne Valley, PERMANENTE (BR. CUPERTINO), CALIF. Permanente Cement Co., (subsidiary Henry J. Kaiser Co.) Kaiser Center, Oakland, Calif.

CANADA

BUILDINGS—LB & CA

▲ **Pigott Constr. Co., Ltd.,** 1250 Bay St., Toronto, Ont., CA Est. $5,000,000, SHOPPERS WORLD SHOPPING CENTRE, incl. 65,000 sq. ft. department store for T. Eaton Co. Ltd., Danforth Ave., TORONTO, ONT. Peel Village Developments Ltd., 234 Eglinton Ave. E., Toronto, Ont. CD 10/17/61.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲ **West Pakistan**—BA 11/13—Kuljian Corp., c/o F. J. Harte, buyer, 1200 N. Broad St., Phila. 21, Pa., U.S.A., Proj. K-2120, ELECTRIC TRANSMISSION and DISTRIBUTION SYS. for 15,000 kw. Quetta Thermal Power Station, Sheikh Mauda, near Quetta for Water & Power Development Auth., 1 Goulding Rd. (off Queens Rd.), Lahore, West Pakistan. Duplicate copy of bids must be sent to owner.

BUILDINGS—LB & CA

▲ **Kellogg International Corp. Ltd.,** 62-72 Chiltern St., Baker St., London W 1, England, subsidiary of The M. W. Kellogg Co., 711 3 Ave., New York 17, N. Y., U.S.A., CA 50,000 barrel/day REFINERY, FRANKFURT, GERMANY. Caltex Oil (Germany) G.m.b.h. subsidiary Standard Oil Co. of California, 225 Bush St., San Francisco, Calif., U.S.A. CD 9/21/61, under CA.

LATIN AMERICA

BUILDINGS—BA

▲ **Colombia, Bogota**—BA 11/15—Empresa de Energia Electrica de Bogota, c/o J. G. White Engineering Corp., engrs., 80 Broad St., New York 4, N. Y., U.S.A., Spec. 2957 (a) 33,000 KW ASME AIEE preferred standard STEAM TURBINE GENERATOR with direct connected exciter (b) surface condenser (c) five feedwater heaters, incl. deaerator (d) evaporator with deaerating preheater, Spec. 2958 (a) one STEAM GENERATING UNIT to generate 310,000 lb. steam per hour with superheater outlet pressure of 900 psig, etc. (b) coal pulverizing and oil burning equipment (c) forced and induced draft fans (d) dust collector (e) gas and air ducts (f) supporting steel, Zipaquira Thermal Electric Plant Unit No. 2. Plans deposit $50.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **Egypt**—BA 12/2—Ways & Works Dpt., Egyptian Railways, 2 Midan Ramses, Cairo, double swing RAIL and ROAD BRIDGE over Suez Canal at El-Ferdan. Extended date. CD 6/16/61.

For additional reports see CONSTRUCTION DAILY REPORTS SECTION

PROPOSED PROJECTS

WATER SUPPLY

▲ **Va., Portsmouth**—City, City Hall, $5,600,000 bond election Nov. 7, 31 mi. WATER TRANSMISSION MAINS, Suffolk to Portsmouth, $3,600,000; ELEVATED WATER STORAGE RESERVOIR, $500,000; WATER PUMPING STATIONS $300,000; WATER FILTRATION PLANT, $1,000,000; GROUND WATER STORAGE RESERVOIR, $200,000. CD 1/12/61.

SEWERS, WASTE DISPOSAL

▲ **Calif., Carlsbad**—Vista Sanitation Dist. and City of Carlsbad, City Hall, joint SEWERAGE SYS., incl. interceptor and outfall sewers, pumping stations, sewage treatment plant and ocean outfall. $4,678,500. Engineering Service, Inc., 150 E. Foothill Blvd., Arcadia, engr. CD 10/12/61.

▲ **Ill., Urbana**—Urbana-Champaign Sanitary Dist., Robeson Bldg., Champaign, SEWERAGE TREATMENT PLANT at confluence Copper Slough and Phinney Branch, PUMPING STATION near Country Squires Subdivision, smaller TREATMENT PLANT, Yankee Ridge area, SEWER LINES for area east of US 45 and north of Carroll Addn. in Urbana and extension N. Romine St. INTERCEPTOR SEWER, $7,000,000. Bond election in 1962. CD 3/7/58.

STREETS AND ROADS

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROAD,
New York Co.—West Side (Miller) Hy. reconstr., New York City. $30,000,000. Blauvelt Eng. Co., 468 Park Ave. So., New York 16, N. Y., consult. engr. Bids 1962. CD 2/7/57, under N. Y., New York.

EARTHWORK, WATERWAYS

▲† **Arizona-Utah** — Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo.,

(Continued on page 71)

Don't Gamble

...you KNOW

CLOW CAST IRON PIPE

will last over 100 years!

Don't take a chance that breakage, leakage, deterioration and all the many other problems substitute pipe can bring will come back to haunt you. Cast iron pipe is the only real economy, the only truly low-cost pipe.

Why gamble when you KNOW that CLOW cast iron pipe will serve for over a century...is the *only* time-proven material?

Call on CLOW whatever your waterworks requirement. Our facilities, experience and manufacturing skill are at your service.

JAMES B. CLOW & SONS, Inc.

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Subsidiaries:

EDDY VALVE CO. • Waterford, N.Y.

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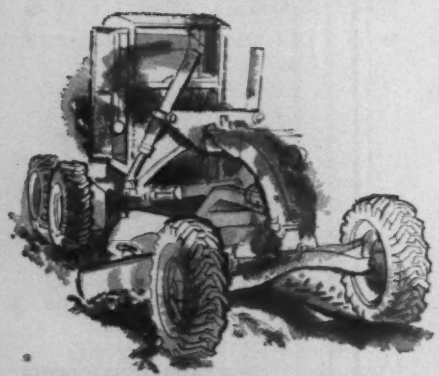
CLOW CAST IRON PIPE

Strength to spare



In motor graders strength is important. Strength to withstand the shock and strain encountered in the heaviest grading jobs. In Huber-Warco graders the backbone of strength is the frame . . . it assures dependability for any job. Like those on the 8, 9, 10 and 11-D series, this all-welded, low-stress, single-member steel frame has reserve strength built in. Of full box-section design, its two steel channels are boxed together with heavy steel plates top and bottom. These two channels, which separate just behind the saddle, are further reinforced on the inside with heavy steel plates assuring strength to spare for even the most strenuous jobs. What's more, you get better visibility plus extra clearance for blade maneuverability due to Huber-Warco's high-arch design. Investigate these and the other plus features you get with Huber-Warco equipment— motor graders, 3-wheel and tandem rollers, maintainers. Your Huber-Warco distributor has all the details.

HUBER-WARCO COMPANY • MARION, OHIO, U.S.A.

HUBER W WARCO

(Continued from page 69)

PLACEMENT OF CONCRETE in Glen Canyon Dam, continue constr. of GLEN CANYON POWERPLANT and SWITCHYARD, Dam, Powerplant and switchyard, and purchase additional materials and equipment, Glen Canyon Unit. $35,275,000 (appropriated).

▲† **California**—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo.,
TRINITY DAM,
LEWISTON DAM,
CLEAR CREEK TUNNEL,
WHISKEYTOWN DAM and TUNNEL,
Trinity, Clear Creek and Spring Creek POWER PLANTS.
TRANSMISSION FACILITIES, Cottonwood,
Spring Creek Debris DAM,
Red Bluff Diversion DAM, Sacramento Canals Division.
El Dorado DISTRIBUTION SYS., Central Valley Proj., Trinity Div. $54,367,000 (appropriated). CD 5/4/44.

▲† **Montana**—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo., EXCAVATION for DAM, stripping canyon walls, excavation for diversion and spillway tunnels, placement of concrete for tunnel lining and work in powerplant and switchyard areas, access roads Government camp constr., turbines for powerplant, Yellowtail Dam and Powerplant, Yellowtail Unit, Missouri River Basin Project. $11,387,000 (appropriated). CD 1/16/53.

▲† **Montana**—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo., RELOCATION RAILROAD, Clark Canyon Dam and Reservoir area; CLARK CANYON DAM, BARRATTS DIVERSION DAM and first sections EAST BENCH CANAL, laterals and drains, East Bench Unit, Missouri River Basin Project. $5,052,000 (appropriated). CD 9/15/60.

▲† **Nebraska**—Bureau Reclamation, Dpt. Interior Bldg., 53, Denver Federal Center, Denver 25, Colo., Merritt DAM and RESERVOIR and ACCESS ROAD, Ainsworth Unit, Missouri River Basin Proj., $3,269,000 (appropriated). CD 5/25/44.

▲† **Texas**—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo., TWIN BUTTES DAM and RESERVOIR. San Angelo Project. $7,385,000 (appropriated). (CORRECTION-owner's address). CD 10/25/61.

▲† **Texas**—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Zone 25, Colo., TWIN BUTTES DAM and RESERVOIR, San Angelo Project. $7,385,000 (appropriated). CD 9/14/60.

▲† **Utah and Wyoming**—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo., CONCRETE PLACING OPERATIONS Flaming Gorge Dam; constr. POWERPLANT and SWITCHYARD; highway from Greendale Junction to right abutment of dam; relocation State Hy. 43 and of Forest Service facilities, Flaming Gorge Unit, Colorado River Storage Project, $11,430,000 (appropriated).

▲† **Utah**—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo., RELOCATION U. S. Hy. 50 and State Hy. 92, Blue Mesa Reservoir area; Blue Mesa Dam Powerplant, switchyard, Morrow Point Dam, Constr. in 1963; POWERPLANT and SWITCHYARD, TEMPORARY CONSTR. CAMP, Curecanti Unit, Colorado River Storage Project. $6,222,000 (apropriated). CD 9/7/44.

▲† **Wyoming**—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Bldg. 53, Denver 25, Colo., government-furnished equipment installed in Fontenelle DAM, Green River, first reach of West Side Canal, temporary construction camp, permanent O & M service bldgs., and O & M houses, for construction personnel, Seedskadee Project, CRSP, $5,846,000 (appropriated). CD 9/15/61.

AIRPORTS

▲ **Alaska, Anchorage**—State Dpt. P. Wks., Juneau, plans by Manley & Mayer, Loussac Sogn Bldg., Anchorage, 2 story, 91,000 sq. ft. TERMINAL BLDG. ADDN., Anchorage International Airport. $4,500,000. CD 1/12/61.

UNCLASSIFIED

▲ **Louisiana**—Mississippi and Tennessee-Tennessee Gas Pipeline Co. (Div. Tennessee Gas Transmission Co.), Box 2511, Houston 1, Tex., 158 mi. 36 in. GAS LOOP LINES various sections between Kinder, La. and Centerville, Tenn. $11,850,000.

▲ **N. Y., New York**—Hudson Harbor, Inc., 295 Fifth Ave., New York, N. Y., MARINA, swimming pool, heliport and seaplane facilities, hotel, Hudson River at Dyckman St. $6,000,000. William Tabler, 401 7 Ave., Zone 1, archt. for hotel. Morris Lapidus, Harle & Liebman, 139 E. 56 St., Zone 22, coordinating archts. Praeger-Kavanagh-Waterbury, 126 E. 38 St., Zone 16, consult. engrs. Bids early 1962. CD 1/19/61.

▲ **Pa., Phila.**—Liberty Bell Park Corp., 1700 Girard Trust Bldg., plans by Alexander Ewing & Assocs., Broad and Chestnut Sts., HARNESS RACING TRACK, CLUBHOUSE and facilities. $12,000,000. CD 6/20/60.

PUBLIC BUILDINGS

▲ **Ill., Chicago**—University of Illinois, Urbana, plans by Richardson, Severns & Scheeler, Champaign, and Shaw Metz & Assocs., 208 S. La Salle St., Zone 4, MEDICAL SCIENCES ADDN., $5,400,000, BA early 1962; LIBRARY, $2,000,000; HOSPITAL ADDN., $10,000,000; completing East DENTAL-MEDICAL-PHARMACY BLDG., $3,000,000; PHYSICAL PLANT SERVICES BLDG., $1,000,000; MEDICAL RESEARCH LABORATORY, $2,000,000, all foregoing work at Medical Center. CD 5/10/61.

▲ **Mich., Southfield**—Southfield P. Schools, 24675 Lahser Rd., bond election Nov. 27, SCHOOLS. $7,200,000. CD 6/18/57.

▲ **N. C., Charlotte**—Mecklenburg Co. Bd. Educ., 720 E. 4th St., $8,600,000 bond election Dec. 19, SCHOOLS.

▲ **Wash., Spokane**—City, City Hall, plans by McClure & Adkison, Sherwood Bldg., and Walker & McGough, Great Northwest Life Insurance Bldg., CITY HALL, PUBLIC SAFETY BLDG., CONTROL CENTER for civil defense operations. $9,000,000. BA 3/15/63. CD 10/16/61.

COMMERCIAL BUILDINGS

▲ **Calif., Hayward**—California and Nevada Dist. Lutheran Church-Missouri Synod, 465 Woolsey, San Francisco, educational SEMINARY or COLLEGE, near 150 Ave. $6,000,000.

▲ **Calif., San Diego**—Third and "B" Corp., c/o Irvin Kahn, 3010 Cowley Way, Zone 17, plans by Jack A. Charney, 460 S. Robertson Blvd., Beverly Hills, 17 story, bsmnt. OFFICE 200,000 sq. ft. first 6 story rein.-con., top 11 story structural steel air-conditioned UNITED CALIFORNIA BANK BLDG., 400-car parking, "B" St. between 3 and 4 Sts. $8,000,000. Bids early 1962.

▲ **D. C., Wash.**—Societa Generale Immobiliare, Rome, Italy, plans by Professor Luigi Moretti, University of Rome, Rome, Italy, and Milton Fisher (Corning, Moore, Elmore & Fisher), 1302 18th St., N.W., Water Gate Development, three 1,400 unit APARTMENTS, 350 room HOTEL, 200,000 sq. ft. OFFICE, 19 TOWNHOUSES, Virginia and New Hampshire Aves., F St. and Rock Creek Parkway, N.W. $50,000,000. CD 5/19/54, under Potomac Plaza Development Corp., as owner.

▲ **Mich., Detroit**—Arthur Fleischman Co., 12585 Gratiot Ave., plans by Giffels & Rossetti, 1000 Marquette Bldg., Zone 26, 30 story luxury type APARTMENT and UNDERGROUND PARKING FACILITIES, East Jefferson Ave. near Hibbard St. Over $12,000,000. Bids 1962.

▲ **Mich., Detroit**—Four Freedoms Assn., c/o U.A.W. Headquarters, 8000 E. Jefferson, plans by John Hans Graham, 2000 K St. N.W., Wash., D. C., 22 story air-conditioned APARTMENT, recreation facilities, Orleans and Larned Sts. $5,000,000. Bids 1962.

▲ **Miss., Biloxi**—Holcomb & Milner, Inc., 2300 14th St., Gulfport, plans by August Perez & Assocs., 2609 Canal New Orleans, La., 334,000 sq. ft. Edgewater Plaza SHOPPING CENTER, 43,000 sq. ft. air-conditioned MALL, 3,000 car parking, 40 acre tract, U.S. Hy. 90, Edgewater Gulf Hotel Property. $5,000,000. To go ahead in January 1962.

▲ **N. Y., New York**—Kratter Corp., 521 5 Ave., New York, Zone 17, plans by Kelly & Gruzen, 10 Columbus Circle, Zone 19, 33 story, penthouse APARTMENT, west side First Ave. from E. 63 to E. 64 Sts. Over $10,000,000.

▲ **Tex., Dallas**—National Bank of Commerce, 914 Elm St., plans by Harwood K. Smith & Partners, 506 Southland Center, and Darles Y. Foster Assocs., 2727 Cedar Springs Rd., assoc. archts., 26 story bsmnt., masonry OFFICE, Pacific Ave. near Akard St. $11,000,000.

▲ **Va., Rosslyn**—Windridge Redevelopment Corp., 4744 32nd St. North, Arlington, plans by Vlastimil Koubek, 810 18th St. N.W., Wash., D. C., 12 story OFFICE and HOTEL to be known as Ames Bldg., triangular block bounded by North Nash St., Fort Myer Dr. and Wilson Blvd. $8,000,000.

INDUSTRIAL BUILDINGS

▲ **Alaska, Anchorage**—Standard Oil Co. of California, 225 Bush St., San Francisco, Calif., OIL REFINERY, at Nikiski south of here. $10,000,000. Work expected to begin next Spring.

▲ **N. J., Holmdel**—James M. Rice Assocs., 17 Brinkerhoff Ave., Teaneck, 300 acre INDUSTRIAL PARK, Rte 35, Holmdel and Raritan Townships. $5,000,000. CD 7/13/61.

AMERICANS ABROAD

▲ **West Pakistan**—West Pakistan Water & Power Development Auth., The Pipals, Lower Mall, Lahore, will ask bids next year on large CANAL PROJECTS, part of the Indus Basin development: 78 mi. Qadirabad-Balloki Link Canal from Qadirabad on the Chenab River to Balloki on the Ravi River, with 20 mi. feeder canal. Bids in the Spring. A second 28 mi. Rasul-Qadirabad Link Canal from Rasul on Jhelum River to Qadirabad. Bids in Fall. Both jobs include bridges, aqueducts and siphons. Bidders wishing to prequalify must supply name and address of company with name and title of person to whom correspondence should be directed by December 15 to Tipton & Kalmbach, Inc., consult. engrs., at P.O. Box 589, LaHore, West Pakistan, with copy to engineers office at 831 14 St., Denver 2, Colo., U. S. A.

FOREIGN

▲ **Africa**—Administration Council, make up of Governments of Swaziland, Mbahane, Basutoland, Masero and Bechuanaland, Makeking, 140 mi. RAILROAD from Ngwenya (Bomvu Ridge) to the Mozambique frontier. $22,400,000.

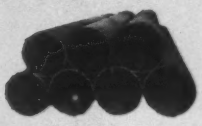
▲ **India**—West Bengal Electricity Bd., Calcutta, 18,000 kw. DAM, Jaldhaka River. $9,450,000.

For additional reports see CONSTRUCTION DAILY NEWSLETTER

(Proposal Advertisements see pp. 77 to 80)

POSEY

LARGE O.D. STEEL PIPE



¼" to 1½" plate to 84" O.D.

Mild steel, high carbon, high manganese steel, wrought iron, stainless steel, stainless & nickel clad pipe to AWWA, ASTM, ASME Spec.

For FREE 16-page illustrated catalog, write:

Custom Fabrication For Over 50 Years

DIVISIONS:
• Iroquois Asphalt Plants • Mixers and Blenders
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561 S. PRINCE STREET LANCASTER, PA.

81 HYDRAULIC JACKS & PULLERS to choose from

Self-Contained STANDARD JACKS 1½ to 100 tons capacity.

Self-Contained CENTER-HOLE PULLERS 30 to 100 tons capacity.

SIMPLEX RE-MO-TROL UTIL-A-TOOL JACKS JENNY ROC-TOE

WRITE FOR CAT. H-60

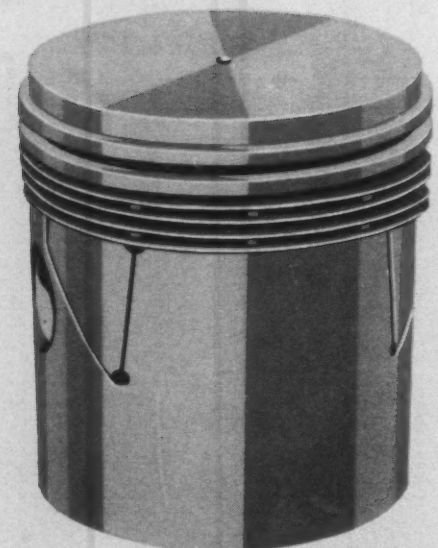
TEMPLETON, KENLY & CO.
2553 Gardner Road Broadview, Illinois

ALWAYS USE POSTAL ZONE NUMBERS

Without the zone number addresses are incomplete in 106 U. S. cities.

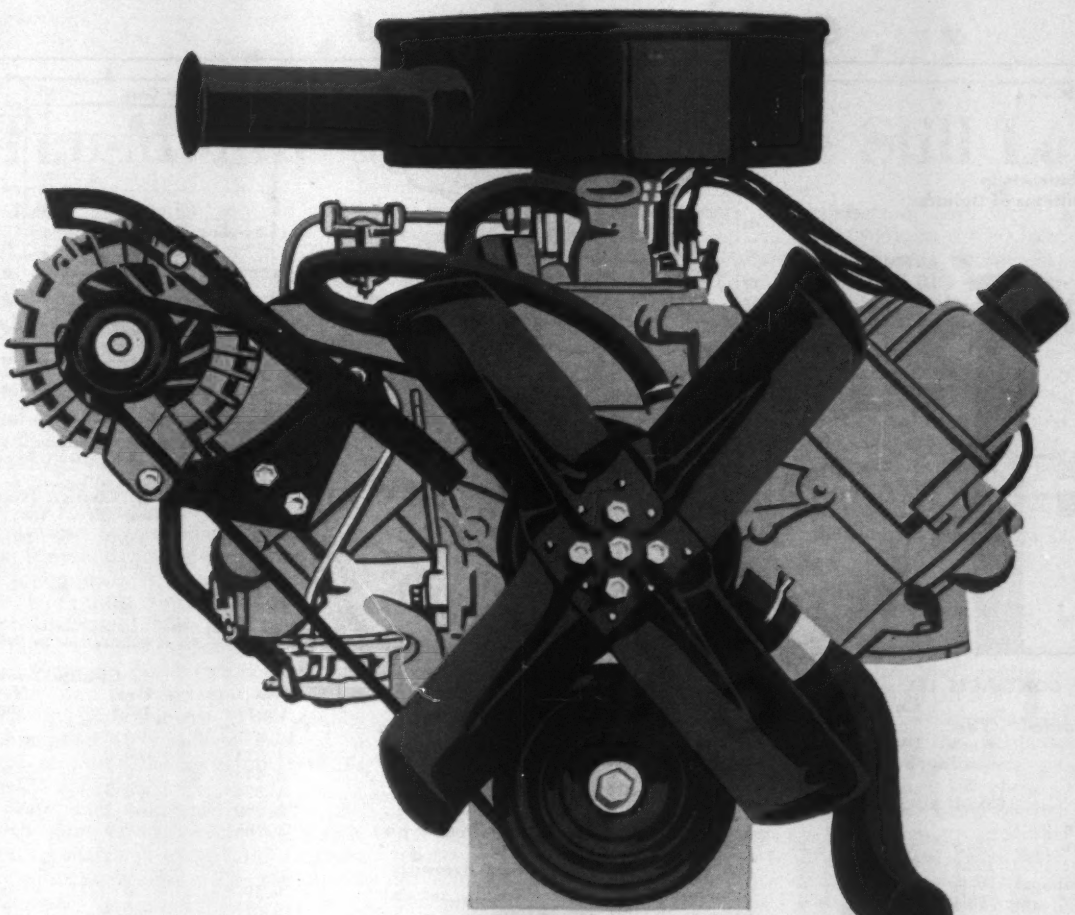
"OUR 1953 DODGE HAS NEEDED ONLY A FRONT BRAKE RE-LINE JOB IN OVER 130,000 MILES!"

Three C's Lumber & Supply Co.,
Columbus, O.



"ALL 102 OF OUR '48 DODGES HAVE GONE AN AVERAGE OF 90,000 MILES EACH WITHOUT A PISTON OR A RING BEING REPLACED."

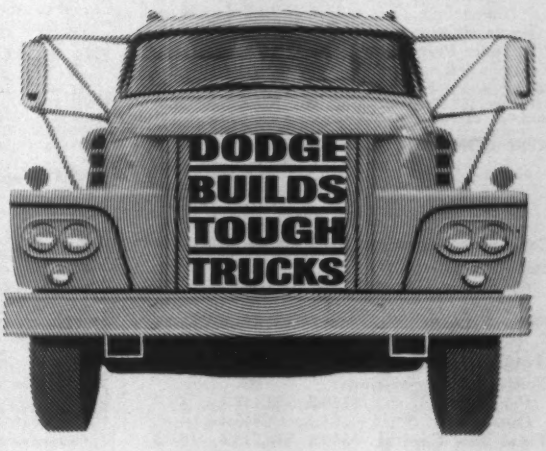
Capitol Dairy Co.,
Chicago, Illinois



"WE GET 125,000 TO 140,000 MILES FROM THE ENGINES IN OUR 8 DODGES BEFORE WE THINK OF REPLACING 'EM."

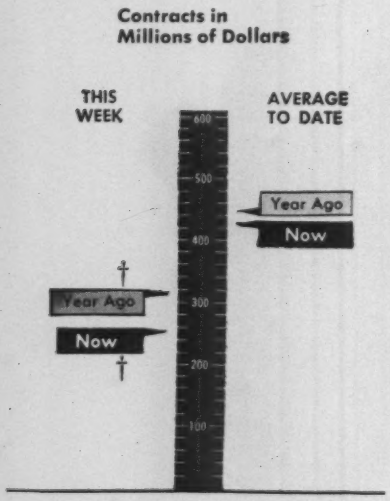
W. Hudman, Livestock Trucker, Lubbock, Tex.

DODGE TRUCKS FOR 1962 have more than 50 engineering advances that make them tougher, more tight-fisted than ever. Included are new 2-speed axles, heavier transmissions, more economical diesel power, and new distributors and starters. See and drive the 1962 Dodges—America's only Job-Rated trucks—at your Dodge dealer's.



Construction Scoreboard

This Week...



AMOUNT OF CONTRACTS LET

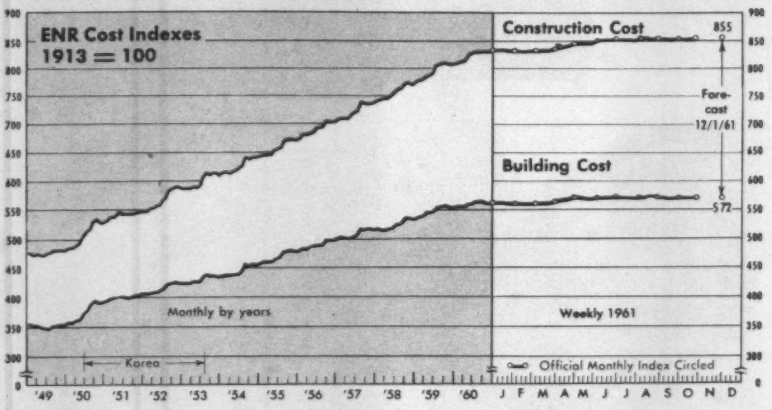
Contracts Awarded In 50 States By Type	This Week millions	Cum. 45 wks 1961 millions	Chge '60-'61 %
All Heavy Construction	$255.4†	$19,341.4	— 2
By Ownership			
PRIVATE	146.6	9,600.2	— 8
PUBLIC	108.8	9,741.2	+ 6
State & Municipal	85.4	7,643.5	+ 6
Federal	23.4	2,097.7	+ 4
By Type of Work			
PUBLIC			
Waterworks	4.2	344.6	—16
Sewerage	8.8	714.8	+38
Bridges*	1.7	566.1	—20
Highways	41.7	3,282.7	+12
Earthwork, Dams & Waterways	13.8	711.0	+ 6
Buildings:			
Excl. Housing	22.0	2,289.1	+ 7
Housing	8.1	726.7	+22
Unclassified	8.5	1,106.9	—10
PRIVATE			
Buildings:			
Mass Housing	87.2	4,479.5	—10
Commercial	29.1	2,271.3	+ 6
Industrial	27.4	2,459.6	+ 4
Unclassified	2.9	389.1	—60

* Includes Private bridges
† 4-day week

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Nov. 2 millions	Cum. 44 wks 1961 millions	Chge '60-'61 %
Corporate Securities	$68.2	$3,067.6	— 7
State & Municipal:			
All Except Housing	111.2	5,694.5	+ 4
Housing	7.4	120.3	—36
Federal Loans	0.7	203.0	+23
Federal Aid	0	3,535.7	+10
Total Nonfederal	$187.4	$12,621.2	+ 2
Federal Appropriations:			
Projects in U. S.	$119.2	$3,448.1	+ 9
Outside U. S.	53.7	145.4	— 9
Total New Capital	$360.3	$16,214.6	+ 3



ENR INDEXES (1913=100), 20-cities' average	Week of Nov. 2 1961	% Change from Oct. 28 1961	% Change from Nov. 3 1960
Construction Cost	855.35*	+0.1	+6.5
Building Cost	570.77*	0	+1.7

* Official Monthly Index for November, 1961

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.950.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

This Month . . .

WAGE RATES, 20-cities' average	Nov. 1961	% Change from Oct. 1961	% Change from Nov. 1960
Common	$2.877	+0.2	+4.8
Skilled (average 3 trades)	4.253	+0.2	+3.9
Bricklayers	4.445	0	+3.1
Structural Ironworkers	4.324	+0.3	+4.3
Carpenters	3.990	+0.2	+4.1
Equipment operators (average three types)	3.906	+0.6	+4.8
MATERIAL PRICES, 20-cities' average			
Structural Steel (average 3 mills), per cwt	5.50	0	0
Lumber, 2x4 Fir, per M fbm	115.01	−0.4	−0.8
Lumber, 2x4 Pine, per M fbm	106.60	−0.1	−1.7
Cement, bulk, per bbl	4.02	−0.3	0
Sand, per ton	2.313	−1.8	−2.1
Ready-mixed concrete, per cu yd	14.21	0	−1.0
Gypsum sheathing, ½"x2'x8', per Msf*	61.52	0	−1.6
Fiber board sheathing, ½" sq. ed., per Msf*	70.84	0	+0.3
Mineral wool insulation, 3' batts, per Msf*	66.52	0	−2.1
Crushed stone, 1½", per ton, CL	2.683	−1.1	+1.3
Concrete blocks, sand/gravel, 8"x8"x16", each*	2.258	0	−1.2

Latest Month . . .

	Oct. 1961	Sept. 1961	Oct. 1960
Brick, common per M	41.28	0	+0.1
Lime, hydrated finishing, per ton, CL	39.28	0	+2.6
Structural clay tile, 3x12x12", per M, 2,000 up*	193.35	0	+2.7
Vitrified clay sewer pipe, std 12", per ft	1.459	+0.2	+3.5
Concrete sewer pipe, 12", per ft	1.451	0	+2.3

* Delivered, trucklots

ENR INDEX REVIEW

	Construction Cost		Building Cost		Volume	
1960	1913=100	1949=100	1913=100	1949=100	1913=100	1949=100
Oct	829.58	173.90	561.45	159.60	591	171
Nov	830.09	174.01	561.11	159.50	609	176
Dec	830.61	174.12	561.50	159.61	503	145
1960 Average	823.55	172.64	559.43	159.02	597	172
1961						
Jan	834.32	174.90	562.91	160.01	557	161
Feb	834.27	174.89	562.93	160.02	464	134
Mar	834.16	174.87	562.89	160.01	519	150
Apr	837.58*	175.58*	565.19*	160.66*	598*	173*
May	847.32*	177.62*	568.99*	161.74*	609*	176*
June	850.38*	178.28*	570.17*	162.07*	634*	183*
July	853.64*	178.95*	571.66*	162.50*	609*	176*
Aug	854.09*	179.05*	570.86*	162.27*	587*	170*
Sept	854.01*	179.03*	571.34*	162.40*	549*	159*
Oct	854.48*	179.13*	570.55*	162.18*	628*	182*
Nov	855.35*	179.31*	570.77*	162.25*	...	...

* Subject to adjustment due to retroactive wage increases.

Ten-Month Contract Volume Still Lags

Heavy construction contract awards in October totaled $1,869 million, 13% above September and 4% above October 1960. The October total brings 10-month volume to $18,559 million, only 2% below the same period of 1960.

Both private and public construction contributed to October's strong showing. New work from private sources rose 15% over September to $990 million. Main push came from industrial building, which spurted to $323 million, more than double September's total of $139 million.

Because of continued heaviness in the mass housing and unclassified construction markets, the $9,136 million worth of private contracts booked in the first 10 months falls 10% below '60.

Public construction made sharp gains over September and October, with all sectors but highways and unclassified showing improvement. Total public contracts of $879 million awarded in October raised the 10-month total to $9,423 million.

State and municipal projects provided most of the volume in public works, chalking up $7,393 million through October for a 7% rise over a year ago.

Electric utilities sparked October's rise in industrial building. The $323 million worth of industrial contracts makes October the second largest month of 1961 and the best October since 1956.

Private mass housing contracts totaled $461 million in October. Although 2% below September, housing awards registered a 7% rise over a year ago. More than 40% of the month's new housing volume was concentrated in the Middle Atlantic states, with apartments contributing a large share of the total.

Commercial building eased in October, slipping below the preceding month and October 1960.

Among state and municipal construction projects, highways continued as the largest sources of new business for contractors. Although slipping in recent months, the $3,169 million worth of contracts booked in the first 10 months is 12% above last year.

Public buildings (other than housing) contend for second place in the public works market. Contracts for colleges, high schools and public office buildings helped push the public buildings category close to the previous big year of 1958. The $2,240 million in new contracts in contractors' books tops last year by 11%.

Only two regions, the South and Middle Atlantic, gained over '60.

Costs Rise for November

After a slow, steady decline in October, construction costs hit an all-time high this month. ENR's 20-Cities Construction Cost Index stands at 855.35, a 0.2% rise over October. The index, which measures the cost of basic materials and common labor, is based on 1913 as 100.

The boost in the 20-cities average reflects a 10-cent-an-hour wage boost for common labor on heavy construction projects in New Orleans and St. Louis.

Lumber prices added to the cost pressures as Douglas fir and southern pine 2x4s stumbled from the doldrums to move up $1 per Mbf in Chicago and New York.

In Philadelphia, Douglas fir rose $3.50 per Mbf and southern pine 2x4s soared $6.50 per Mbf.

ENR's 20-Cities Building Cost Index, hanging on the coat-tails of the Construction Cost Index, goes to 570.77 this month, 0.1% above October. This index is also based on 1913 as 100.

Hourly wage rates that raised the Building Cost Index were increases of 5 cents for carpenters, structural ironworkers and bricklayers in New Orleans, and boosts of 10 cents for carpenters and structural ironworkers in St. Louis.

The Construction Cost Index this month is up 3% from November 1960 and the Building Cost Index, up 1.7% from November 1960.

Engineering Construction Contracts for October

	October, 1961								Ten Months			
	New England	Middle Atlantic	South	Mid-West	Mississippi to Rockies	Far West	Total U. S.	% Change '60 to '61	U. S. Cumulative 1961 (43 wks.)	U. S. Cumulative 1960 (43 wks.)	% Change '60 to '61	Canada Oct. 1961
Public Works, Total	**69,032**	**144,565**	**179,837**	**126,706**	**203,129**	**156,122**	**879,391**	**+26**	**9,423,497**	**8,815,867**	**+ 7**	**60,353**
Waterworks	871	1,962	5,542	13,339	10,831	5,394	37,939	+66	333,345	385,603	−14	1,683
Sewerage	6,820	20,176	15,243	44,557	10,855	13,755	111,406	+164	682,321	485,004	+41	2,772
Bridges	12,827	11,887	15,050	5,521	8,044	5,102	58,431	+51	551,058	673,345	−18	6,716
Earthwork, waterways	314	16,477	5,627	2,194	33,653	7,897	66,162	+57	684,331	649,391	+ 5	11,691
Streets and roads	26,568	27,367	63,977	25,723	78,756	48,792	271,183	− 4	3,168,906	2,836,004	+12	10,768
Buildings: Residential	1,123	17,660	11,150	7,252	14,545	9,195	60,925	+104	695,179	560,389	+24	650
Other	19,951	43,871	46,910	22,820	40,055	56,292	229,899	+32	2,239,545	2,015,079	+11	17,390
Unclassified	558	5,165	16,338	5,300	6,390	9,695	43,446	−35	1,068,724	1,210,992	−12	8,683
State & Municipal	67,059	127,380	164,789	123,733	145,512	132,583	761,056	+27	7,392,978	6,881,464	+ 7	41,439
Federal	1,973	17,185	15,048	2,973	57,617	23,539	118,335	+22	2,030,429	1,934,403	+ 5	18,914
Private, Total	**69,378**	**428,851**	**112,479**	**138,120**	**141,303**	**99,524**	**989,655**	**−10**	**9,135,605**	**10,187,869**	**−10**	**120,287**
Bridges									653	5,507	−88	
Buildings: Industrial	33,816	161,633	26,799	49,760	43,372	7,783	323,163	+71	2,361,049	2,319,009	+ 2	53,310
Mass housing	16,882	197,084	56,309	54,842	58,338	77,779	461,234	+ 7	4,233,732	4,857,420	−13	59,412
Commercial	18,430	61,321	21,540	28,261	27,031	13,547	170,130	− 5	2,157,821	2,052,782	+ 5	7,842
Unclassified	250	8,813	7,831	5,257	12,562	415	35,128	−88	382,350	953,151	−60	723
Total, Oct., 1961—4 wks.	**138,410**	**573,416**	**292,316**	**264,826**	**344,432**	**255,646**	**1,869,046**	**+ 4**				**180,641**
Total, Sept., 1961—4 wks.	77,666	479,265	272,679	210,453	349,561	267,499	1,657,123					146,766
Total, Oct., 1960—4 wks.	104,883	324,042	273,900	312,055	277,905	502,749	1,795,534					262,734
Ten mos., 1961 (43 wks.)	**944,220**	**4,474,202**	**3,153,045**	**2,769,701**	**4,081,340**	**3,136,504**			**18,559,012**		**− 2**	**1,499,949**
Ten mos., 1960 (43 wks.)	1,189,880	4,451,587	2,959,156	2,920,911	4,255,845	3,226,357				19,003,736		1,684,014
% Change '60 to '61	−21	+1	+7	−5	−4	−3						−11

ENGINEERING NEWS-RECORD reports U. S. (50 states) construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

Open Shop Group Invades Philadelphia

The aim is to get relief from union intimidation, protect personal freedom, gain equal opportunity

An open shop movement that started in Baltimore, Md., 11 years ago appears to be on the verge of a significant breakthrough into the heavily unionized area of Philadelphia, Pa.

At a meeting last week in Flourtown, a Philadelphia suburb, the Associated Builders and Contractors, Inc. (ABC) received enough favorable response to indicate that a Philadelphia chapter will be chartered in the very near future.

Charles H. Feihe, a past president and former board chairman of ABC, said, "We are beginning to see the day when ABC will be a national association."

The open shop advance under the ABC banner comes at a time when public attention is being focused on the open shop issue by the labor unrest at Cape Canaveral. There, the construction unions and union contractors are disturbed by the increasing amount of work that is going nonunion. Because the Cape and Philadelphia situations represent opposite sides of the same coin, they help to dramatize the complex and basic issues involved.

Mr. Feihe, in explaining the open shop movement at the Flourtown meeting, said: "ABC stands for one underlying principle—the preservation and promotion of the open shop. That is what got us started and that is what got us big. We are not anti-union. Many of our members are union although nonunion members predominate.

"We believe that employers should have the right to conduct their own operations. We believe that workers should have the right to join a union. We do not believe that third parties should have the right to exert pressure on either side through coercion or secondary boycotts."

John P. Trimmer, executive vice president of ABC, explained the open shop movement as an effort to protect management rights, to promote "equal opportunity" and to preserve the free enterprise system.

Pointing to the relatively harmonious situation that now exists in Baltimore, he said the movement is bringing peace, harmony and stability to the industry. It is demonstrating that the various segments of the industry can pull together, and that union and nonunion workers can work side by side.

The major complaint voiced by the Philadelphia employers who attended the Flourtown meeting was that union contractors and construction unions enjoy and maintain a virtual monopoly over metropolitan work.

The independent, nonunion contractors, they said, are getting only "the tail of the chicken" even though they have the skill and capacity to perform the work—and at a lower price. They attributed the freeze-out to a union-oriented municipal administration and to union coercion and intimidation.

Many said they are afraid of trouble and cannot fight union intimidation effectively—or afford to fight it—as individuals. One lawyer at the meeting advised the group to band together and fight, or risk being "dead ducks" within five years. It was the medium of collective action that ABC was offering the Philadelphia employers at Flourtown.

About 50 Philadelphia employers have already signed up for ABC's assistance under the leadership of James L. McGee, an electrical contractor in Oreland, Pa.

The fight for "free labor" through collective action is a service ABC has been rendering ever since the big Stover Steel and Selby-Battersby secondary boycott cases in which ABC played a major role. Those cases helped the association get its feet on the ground.

It was the Selby-Battersby case that struck a fatal blow to a mid-1950 union contractor-building trades union effort to "stabilize" Baltimore labor conditions through use of a "standard agreement" that obligated union contractors to use union subs only (ENR Nov. 10, 1955, p. 82).

Since that time, ABC, which still has its headquarters and main strength in Baltimore, has established chapters in Washington, D. C.; Georgetown, Del.; Lancaster, Pa.; Anne Arundel County, Pa. and Western Maryland (Hagerstown). In addition to the incipient chapter in Philadelphia, it has a group in Boston, Mass., that is not yet formally organized.

As of last week, the association had 852 member firms. The companies range from general contractors, through most of the mechanical and specialty groups, to suppliers and bonding companies. About 8% of the members are union. Some of them are also members of the Associated General Contractors, National Association of Home Builders, and American Road Builders Association, according to ABC records.

The services rendered by ABC are as varied and formalized as those performed by most trade associations. One of ABC's important jobs, Mr. Trimmer pointed out, is that of helping members convince owners of the fairness and reasonableness of the open shop method, and of the ability of ABC members to perform quality work at lower prices.

Contrary to the contentions of open shop opponents, Mr. Trimmer said, ABC contractors have skilled and capable employees who are not prone to wasteful work practices or jurisdictional disputes. ABC operates several registered apprenticeship programs of its own. The wage scales of ABC employees he noted, are generally lower than union scales but employment is steadier and annual incomes higher than most union workers enjoy.

On the fringe benefit side, according to Mr. Trimmer, ABC has a Connecticut General group life-accident-sickness-insurance plan that provides broad coverage for workers.

The real opposition to the open shop, Mr. Trimmer suggested, comes from those who believe not in equal opportunity but in monopoly. In the arsenal of weapons available to ABC in fighting this are the right-to-work laws and the secondary boycott provisions of labor law. The latter have been described as the "heart" of the open shop movement.

ABC members think the boycott provisions will remain an effective weapon as long as there are people who have the "guts" to use them and as long as Congress refuses to pass the situs picketing bill.

In contrast to the aggressive, collective action through which ABC has made its progress, the open shop growth at Cape Canaveral has resulted largely from the existence of labor's no-strike pledge. The value of that pledge may now be negated by the Missile Sites Labor Commission's proposal of a project agreement for the Cape. Under a project agreement, equal opportunity and stability would presumably be achieved, by establishing uniform terms and conditions—an upgrading that would protect the unions by reducing or eliminating the competitive advantages now held by open shoppers.

OFFICIAL PROPOSALS

Bids: November 16, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and Canal Law and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 16th day of November 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, F. J. Fuller, District Engineer, 353 Broadway, Albany 1, New York						
Albany Rte. 9W	FASH 61-24 FARC 61-157	Delmar By-Pass Part 1 (Elm Ave. to Route 9W) Albany-Bethlehem Center, S.H. 5499 Proj. U-1129(2)	4.18 (2.28 Acc.)	9" Cement Conc. Pavt., 2 @ 24' Var.=3.76 Mi.; Asphalt Conc.=2.53 Mi.; Misc. Work=0.17 Mi. H.G.S. Comp. I-Beam	$225,000 Plans $5	$3,897,000
Greene Rte. 23	FARC 61-149	Cairo-Windham, Part 3, S.H. 8053; Cairo-Windham, Part 2, S.H. 5462. Proj. F-1159(5)	4.55	Asphalt Conc.=4.51 Mi. Misc. Work=0.04 Mi.	$90,000 Plans $5	1,662,000
Rensselaer Rte. 7	RC 61-152	Troy-Brunswick, Part 2, S.H. 25	0.08	Rock Removal	$850 Plans $5	15,000
Washington Rte. 22	FARC 61-154	Whitehall Village: Canal & Broad Sts., S.H. 5531; Whitehall-Dresden Center, Part 1, S.H. 5578; South Bay Bridge, S.H. 9113; Whitehall-Dresden Center, Part 2, S.H. 5637A; Whitehall-Dresden Center, Part 3; Dresden Center-Dresden Station, S.H. 8132; Dresden Station-Putnam, S.H. 8225. Proj. F-371(6)	10.56	Asphalt Conc.=10.16 Mi. Misc. Work=0.13 Mi. Constructing Causeway=0.27 Mi.	$235,000 Plans $5	4,273,000
DISTRICT No. 2, L. Ketchum, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Montgomery	U.S. 106	Lock 14-E, Erie Canal, Canajoharie	....	New Gates; Lowering Sills; Misc. Work	5% of Bid Plans $10	Estimate Confidential
Oneida Madison	M 61-15	Durhamville Aqueduct Over Oneida Creek City of Oneida	....	Rehabilitation of Aqueduct	$2,600 Plans $5	50,000
DISTRICT No. 3, E. E. Towlson, District Engineer, 333 E. Washington Street, Syracuse, New York						
Cayuga Rte. 90	FARC 61-155	Locke-Homer Part 1, S.H. 9089 Proj. F-675(3)	8.73	Asphalt Conc. Type 1A	$65,000 Plans $5	1,187,000
Onondaga (Int. Trg. Rte. 81 & Rte. 11)	FISH 61-21	Interstate Route 505 (Nedrow to Syracuse City Line) Syracuse-Lafayette, S.H. 5365 Proj. I-81-2(65)	3.28 (1.61 Acc.)	9" Cement Conc. Pavt. 2 @ 24' Var.=3.03 Mi.; Asphalt Conc.=1.62 Mi.; Misc Work=0.24 Mi.; 2 Hgs Comp. I Beam & Plate Gird.; 1 Hgs Comp. I Beam	$140,000 Plans $10	2,572,000
DISTRICT No. 6, Wm. J. Dennis, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Allegany Rte. 408	FARC 61-153	Friendship-Belmont, S.H. 5341 Proj. F-294(4)	4.73	Asphalt Concrete	$31,000 Plans $5	564,000
Allegany Rte. 408	FARC 61-156	Cuba-Friendship, S.H. 5174 Cuba-Friendship Part 2, S.H. 5312 Proj. F-326(4); F-294(2)	2.79	8" Cement Conc. Pavt. 24' Var.=2.70 Mi. Misc. Work=0.09 Mi. Twin Reinf. Conc. Box Bridge	$55,000 Plans $5	1,007,000
Schuyler Rtes. 14 & 414	TC 61-6	Watkins Village-Franklin St., S.H. 5335 Watkins-Bennettsburg, S.H. 5295	....	Eight Traffic Signals	$6,500 Plans $5	119,000
DISTRICT No. 8, M. N. Sinacori, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Putnam	FASS 61-14	Milltown Road, CR No. 504 (Bridge and Approaches) Proj. S-611(1)	0.10	Asphalt Concrete Comp. I-Beam Bridge	$6,000 Plans $5	106,000
Rockland	FASS 61-5	New City-Congers, County Rd. (Main St. to Brewery Rd.). Proj. S-311(3)	0.72	Asphalt Concrete	$19,000 Plans $5	332,000
Westchester	SBP 61-1	Sprain Brook Parkway Tuckahoe Rd. to Jackson Ave.	2.60 (3.45 Acc.)	8" Cement Conc. Pavt. 2 @ 36' Var.=3.19 Mi.; Asphalt Conc.=2.80 Mi.; Misc. Work=0.06 Mi.; Reinf. Conc. Closed Box Culvert. Hgs WF Comp. Beam; Conc. Retaining Wall	$230,000 Plans $5	4,103,000
Westchester	TSP 61-1	Taconic State Parkway Realignment Through Mohansic Park (Baldwin Road to Crompond Road)	2.58 (2.49 Acc.)	7" Cem. Conc. Pavt.=3.95 Mi.; Asphalt Concrete= 0.85 Mi.; Misc. Work=0.27 Mi.; 2 Hgs Reinf. Conc. Rigid Frame	$200,000 Plans $5	3,573,000
DISTRICT No. 10, A. M. Sarr, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Bronx (Int. Trg. Rte. 87)	FIMDE 61-1	Int. Route Conn. 512 Major Deegan Expwy.—Contract 20 (Park Ave. to New York City Line) Proj. I-87-1(7)	7.48	Center Mall Barrier and Misc. Work	$18,000 Plans $5	322,000
Nassau	FANE 61-2	Nassau Expwy. Cont. 3 (Burnside Ave. to Central Avenue). Proj. U-1098(7)	0.88	Demolition of Buildings	$1,800 Plans $5	33,000
Nassau	WSP 61-1	Wantagh State Pkwy. Ext. (Northern State Pkwy.-Jericho Turnpike)	....	Demolition of Buildings	$225 Plans $5	4,000
Suffolk	FALIE 61-5	Long Island Expwy., Cont. 13 Islip Ave. (Caleb's Path) to Veterans Memorial Highway Proj. F-862(36)	2.85 (4.77 Acc.)	9" Cem. Conc. Pavt.=3.36 Mi.; Asphalt Concrete= 4.07 Mi.; 2 Hgs. Twin Comp. WF Beam Bridges; 2 Hgs Comp. WF Beam Bridges; Misc. Work=0.19 Mi.	$260,000 Plans $10	4,523,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act. of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bid deposit, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in the "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

District of Columbia—Paving—October 24, 1961. GRADING, DRAINAGE and PAVING, STA. 200+ TO STA. 295+, ANACOSTIA FREEWAY, Federal-Aid Interstate Project No. I-295-2(24)1—Invitation No. C-6255-H, consist. of approx. 22,600 sq. yds. reinf. portland cem. concrete base 8" in depth and 23,640 tons hot asphaltic concrete base course, Class B mixture. Bid forms, plans and specifications are now available from Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $30.00 per set, payable to D. C. Treasurer (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, November 28, 1961, in Room 424, 499 Penn. Ave., N.W.

District of Columbia—Bridge Construction—October 30, 1961. 11TH STREET BRIDGE OVER ANACOSTIA RIVER, EAST STRUCTURE—BRIDGE FILE NO. 56, Contract I—RIVER PIERS, FEDERAL AID INTERSTATE PROJECT NO. EI-295-2(26)5, Invitation No. C-6262-H, consisting of 1,871 cu. yds. Class BB concrete in pier shaft and 19,910 cu. ft. Class A stone masonry. Bid forms, plans and specifications are now available from Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $30.00 per set, payable to D. C. Treasurer. (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, November 29, 1961, in Room 424, 499 Penn. Ave., N.W.

District of Columbia—Building Construction—October 31, 1961. CONSTRUCTION OF DOCTORS' RESIDENCE, D. C. GENERAL HOSPITAL, 19th and C Streets, S.E., Washington, D. C. (Invitation No. C-6275-B). Bid forms, plans and specifications are now available from Procurement Office, D. C., Room 404, 499 Penn. Ave., N.W., upon deposit of a certified check for $100.00 per set, payable to D. C. Treasurer. (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, November 30, 1961, in Room 424, 499 Penn. Ave., N.W.

Bids: November 16, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds sealed proposals will be received until ten-thirty o'clock A.M., Eastern Standard Time, on the 16th day of November, 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 5, N. W. KRAPF, District Engineer, State Office Bldg., 65 Court St., Buffalo 2, New York						
Erie	FASS 61-10 FISS 61-11	Maple Rd. Extension (CR 192) & the Separation of Grades of Maple Road Extension (CR 192) with Powerline Expressway & Lehigh Valley R.R. Proj. S-250(3); I-290-1(44); I-291-1(6)	1.74	Asph. Conc. 1.74 Mi.; HGS Comp. I Beam, 4 Sps, 251' RRGS Comp. I Beam 3 Sps. 178' 2 Reinf. Conc. Twin Box Culverts	$95,000 Plans $5	$1,725,000
DISTRICT No. 10, A. M. SARR, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Queens (Int. Trg. Rte. 495)	FAGCP 61-5 FIHHE 61-2	Grand Central Pkwy., Section 2, Contract 1 (Roosevelt Ave. to 77th Avenue) Int. Rte. Conn. 514 (Grand Central Pkwy.-Horace Harding Expwy. Interchange) Proj. U-UG-899(5); I-495-1(48)	3.72 (5.42 Acc.)	8" & 9" Cement Conc. Pavement, 2 @48'= 3.14 Mi. 8" & 9" Cement Conc. Pavt. Var. = 4.75 Mi. Asph. Conc. = 0.67 Mi. Misc. Work = 0.58 Mi. Riveted Steel Rig. Fr. Structure Welded thru Pl. Gird. Struct.: 2 Ped. Overpass Comp. WF Beam 2 Ped. Overpass WF Beam 1 Ped. Overpass Welded Plate Girder; 3 Comp. WF Cantilever Suspension 1 WF Beam Plus Alterations: Widen Exist. WF Beam Br.	$600,000 Plans $10	11,010,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act of 1956," being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bid deposit, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in the "Information for Bidders."

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: November 16, 1961

New York State Road Work

NOTICE TO CONTRACTORS: THE NEW YORK STATE BRIDGE AUTHORITY, BRIDGE PLAZA, POUGHKEEPSIE, N. Y. Pursuant to the provisions of the Highway Law, and Article 3, Title 2 of the Public Authorities Law, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time, on the 16th day of November 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., on behalf of said Authority, for the following project: M. N. Sinacori, Dist. Engr., Pleasant Valley, Road, Poughkeepsie, N. Y. ORANGE COUNTY.

NAME OF PROJECT & MILES	DEPOSIT FOR PLANS	BID DEPOSIT	ENGINEER'S EST.
NBB. 61-3 Newburgh Beacon Bridge over Hudson River, Cont. 4 Interstate Rte. 503 Newburgh Approach Roadway 0.50(0.10 Acc.) Miles	$5.	$45,000.	$842,000.00

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, New York, and at the office of the District Engineer, noted above, and at the office of the State Department of Public Works, 270 Broadway, New York City, and may also be seen at the New York State Bridge Authority Office at Mid Hudson Bridge Plaza, Poughkeepsie, N. Y.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned to the Bureau of Contracts in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications.

Proposal must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the NEW YORK STATE BRIDGE AUTHORITY for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, and Public Authorities Law, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS
FOR
NEW YORK STATE BRIDGE AUTHORITY
DR. JOHN L. EDWARDS
CHAIRMAN

OFFICIAL PROPOSALS

Bids: December 11, 1961

Refuse Incinerator Plant for the Village of Garden City

NOTICE TO BIDDERS
NASSAU COUNTY, NEW YORK

NOTICE IS HEREBY GIVEN that the Village of Garden City, Nassau County, New York will receive separate sealed bids for the:

BUILDING CONSTRUCTION CONTRACT NO. 1
FURNACES & EQUIPMENT CONTRACT NO. 2
HEATING SYSTEM CONTRACT NO. 3
PLUMBING SYSTEM CONTRACT NO. 4
ELECTRICAL SYSTEM CONTRACT NO. 5
CHIMNEY CONTRACT NO. 6

for the construction of a building and appurtenant structures, complete with site improvements, for a new refuse incinerator. Bids will be received by the Superintendent of Public Works in his office in the Village Hall, Garden City, New York, until 11 o'clock A.M., Eastern Standard Time, December 11, 1961, and then publicly opened and read aloud in the Board Room.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and form of Performance Bond may be examined at the office of the Superintendent of the Department of Public Works, Village Hall, 351 Stewart Ave., Garden City, New York, or the office of the Consulting Engineer, and copies thereof may be obtained from the Superintendent of Public Works upon payment of Fifty ($50.00) Dollars for each set. Any bidder, upon returning such set in good condition within thirty (30) days after the award of contract or rejection of bids, will be refunded his full payment, and any non-bidder upon so returning such set in good condition within the same period of time will be refunded Twenty-five ($25.00) Dollars. Checks given as deposit on plans and specifications shall be made payable to the Village of Garden City.

In general, the work included in Contract No. 1 consists of the construction of a building and appurtenant structures, complete with site improvements, for a new refuse incinerator plant of 175 tons per day capacity. Contract No. 2 covers the installation of furnaces and mechanical equipment. The heating, plumbing and electrical installations are to be executed under Contracts 3, 4 and 5, respectively, and the erection of the chimney under Contract No. 6.

Each bidder must deposit with his bid, an acceptable bid bond in the amount of 100% of the base bid, subject to the conditions herein prescribed.

The Contractor will be required to comply with all provisions of the Labor Laws of the State of New York.

Contractor will be required to provide a performance and payment bond (100% of the accepted bid), property damage and public liability insurance with the provision to hold the Village of Garden City harmless for any accidents occurring during the construction period.

All bids shall be submitted in exact conformity with the "Form of Bid" in the Specifications. Bids must be submitted in sealed envelopes, bearing on the outside, the name of bidder, his address, the name of project, and the contract bid upon.

The Village of Garden City, Nassau County, New York, reserves the right to reject any or all bids, waive any informalities, or to accept that bid, acceptance of which will, in the judgment of the Board of Trustees, best secure the public interest and efficient work.

No bidder may withdraw his bid within forty-five (45) days after the date of opening thereof.

BY ORDER OF THE BOARD OF TRUSTEES OF THE VILLAGE OF GARDEN CITY
Robert D. Harrower, Village Clerk

Bernard J. Gorman,
Superintendent,
Dept. of Public Works.
James S. Gillen,
Superintendent,
Utilities and Engineering.
William Raisch
Consulting Engineer
61 Hilton Ave.,
Garden City, L. I., N. Y.

Dated, Garden City, N. Y.
November 9th, 1961

OFFICIAL PROPOSALS

Bids: November 28, 1961

The Port of New York Authority
Teterboro Airport

MAIN ROOF REPLACEMENT
HANGAR NO. 3
CONTRACT O & M 515A

Sealed proposals for removing the existing vinyl coated metal roofing and furnishing and installing a wood deck, insulation and built up roofing on the main roof of Hangar No. 3 at Teterboro Airport will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M. o'clock Tuesday, November 28, 1961, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of Proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt
Chairman

New York, 11/9/61

Bids: November 28, 1961

The Port of New York Authority
Teterboro Airport

REPLACE HOT AND COLD DOMESTIC WATER LINES
HANGAR NO. 3
CONTRACT O & M 685

Sealed proposals for furnishing and installing the permanent materials necessary or proper for or incidental to replacing the hot and cold domestic water lines and insulating the steam and condensate lines in Hangar No. 3 at Teterboro Airport, Teterboro, New Jersey will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M. o'clock Tuesday, November 28, 1961, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of Proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt
Chairman

New York, 11/9/61

Bids: November 28, 1961

New Jersey Turnpike Authority

CONTRACT NO. R-90

Proposals are invited for Contract No. R-90 (R-90A and R-90B) which involves the construction of Service Building Additions at Service Areas 1N, 1S, 3S, 8N and 10N of the New Jersey Turnpike, and other incidental work located in the Township of Auburn, Salem County; Haddonfield, Camden County; Milltown Township and Woodbridge Township, Middlesex County, New Jersey, respectively.

Proposals may be submitted for separate Contract Nos. R-90A and R-90B, or for a single Contract No. R-90 covering all combined work.

Contract No. R-90A includes the work at Service Areas 1N, 1S and 3S.

Contract No. R-90B includes the work at Service Areas 8N and 10N.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 o'clock, Eastern Standard Time, on the morning of November 28, 1961, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours on or after November 3, 1961, at the office of the Authority, and will be furnished upon payment of Ten Dollars ($10.00) for each set, not refundable.

NEW JERSEY TURNPIKE AUTHORITY
Joseph Morecraft, Jr., Chairman

October 27, 1961
R-90

OFFICIAL PROPOSALS

Bids: November 16, 1961

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 16th day of November 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick St., Binghamton, New York						
Broome	FAC 61-21	Binghamton Arterial Route Collier St. Bridge to Court St. Court St. to Brandywine Ave. at Frederick St. Tompkins St. Bridge and Approaches Proj. U-1019(7), U-496(17), US-725(5)	1.89	Demolition of Buildings	$20,000 Plans $5	$372,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal Aid Highway Act. of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Department of Public Works" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bid deposit, the execution of the contract and bond shall conform to the provisions of the Highway Law, as set forth in the "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: November 28, 1961

The Port of New York Authority
Teterboro Airport

STRENGTHENING OF TIMBER TRUSSES
HANGAR NO. 3
CONTRACT O & M 543

Sealed proposals for strengthening of timber trusses of Hangar No. 3, Teterboro Airport, New Jersey will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M. o'clock Tuesday, November 28, 1961, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of Proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt
Chairman

New York, 11/9/61

OFFICIAL PROPOSALS

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5702) will be received at Huron, South Dakota, until 10 a.m., Central Standard Time, December 12, 1961, for furnishing labor and materials for Oahe-Eagle Butte 115-Kilovolt Transmission Line, Missouri River Basin Project. Location in Stanley and Ziebach Counties, South Dakota. Principal items are 602 structures, furnishing and constructing various types of structures with maximum pole lengths from 40 to 85 feet; 75 miles of line, furnishing and stringing three 477,000 circular-mil ACSR—24/7 conductors; and other work. Completion time 190 days. For particulars, address Bureau of Reclamation, P. O. Box 2553, Billings, Montana; P.O. Box 825, Huron, South Dakota; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5701) will be received at St. Paul, Nebraska, until 10 a.m., Central Standard Time, December 4, 1961, for furnishing labor and materials for earthwork and structures, Farwell Main Laterals and Farwell Lower Main Laterals, Missouri River Basin Project. Location near St. Paul, Nebraska. Principal items are 1,291,000 cu. yds., excavation for laterals and structures; 4,210 barrels, furnishing and handling cement; 29,295 lin. ft., furnishing and laying 12-inch to 48-inch diameter concrete pressure pipe; lump sums, furnishing and installing 28 vertical shaft pumping units having capacities from 1.10 cfs to 4.53 cfs; and other work. Completion time 850 days. For particulars, address Bureau of Reclamation, P. O. Box 143, St. Paul, Nebraska; Building 46, Denver Federal Center, Denver 25, Colorado; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS enable you to get the greatest variety of bids —and so to get the lowest prices consistent with the best work.

OFFICIAL PROPOSALS

Bids: November 28, 1961

Richmond Tunnel
Contract 500

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York 5, New York, until 11:00 A.M., Eastern Standard Time on Tuesday, November 28, 1961, for Contract 500, for the construction of the Richmond tunnel, together with its shafts and appurtenant work. The tunnel, approximately 25,000 feet long, will cross Upper New York Bay and will extend from a shaft in Brooklyn, New York, approximately 925 feet deep, to a shaft in Richmond, New York, approximately 965 feet deep.

Pamphlets of the contract can be obtained in the Secretary's office, Room 1312, at the above address, upon application in person or by mail, by depositing the sum of $10.00 for each pamphlet. There will be a charge of $1.25 to cover mailing costs for each set of contract pamphlets requested. Blueprints of the contract drawings will be furnished at a charge of $3.10. For further particulars, apply at the office of the Chief Engineer at the above address.

ARTHUR C. FORD, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; MARTIN T. GERAGHTY, Chief Clerk.

Bids: December 5, 1961

Philadelphia, Penna.
Procurement Department
Water Department

Sealed bids will be received in Room 313, City Hall Annex, until 2.30 P.M., Eastern Standard Time, on Tuesday, December 5, 1961, and opened at that time for:

BID NUMBER 2873—WORK NUMBER S-2956-R—MILL CREEK SEWER—Reconstruction of Mill Creek Sewer in its Present Location, Brown Street from a Point 27.39 feet West of 50th Street to 53rd and Poplar Streets.

PRINCIPAL ITEMS OF WORK

Excavation	—58,000 cubic yards
16'-0" X 18'-0" Reinforced Concrete Sewer—Arch Top	— 1,900 lin. ft.
13'-0" X 13'-0" Rectangular Reinforced Concrete Sewer	— 615 lin. ft.
10'-0" X 10'-0" Rectangular Reinforced Concrete Sewer	— 50 lin. ft.
Reinforced Concrete Junction Chamber	— 44 lin. ft. long
Branch Sewer Connections	— 300 lin. ft.
Underpinning	— 350 cubic yards
Water Main Relay	— 1,000 lin. ft.
Concrete Paving Base	— 550 cubic yards
Asphalt Paving	— 2,500 square yards

Proposal forms, questionnaires and specifications may be obtained from the Water Department, in Room 1132, City Hall Annex, Juniper Street and Filbert Street, Philadelphia 7, Penna. Blueprints of plans may be purchased at bidder's expense, directly from the Keystone Blue Paper Company, 1230 Arch Street, Philadelphia 7, Penna.

No bids will be received unless bidder is qualified by the Procurement Commissioner. The questionnaire form with all questions fully answered must be filed with the Water Commissioner, Room 1113, City Hall Annex, at least one (1) week prior to the date of opening bids.

Each proposal must be accompanied by security in form and amount as set forth in the proposal form.

OTTO R. WINTER,
Procurement Commissioner

Bids: November 28, 1961*

New York City
Housing Authority

ADVERTISEMENT FOR BIDS
CHELSEA HOUSES

Sealed proposals will be received by the New York City Housing Authority, 299 Broadway, New York 7, N. Y., until 2:30 P.M., November 28, 1961*, at which time said proposals will be opened and read in Room 312, for:

1. Foundations and General Construction
2. Heating and Ventilating
3. Electric Work
4. Plumbing
5. Elevators

For Chelsea Houses (Project No. NYS-102): Located in the area bounded generally by West 26th Street, Ninth Avenue, West 25th Street, and the Elliott Houses Project, excluding a portion in the northeast corner of this area; and also for construction work within the existing Elliott Houses Project, consisting of an extension to the Children's Center and alterations to the Hudson Guild Building, all as more fully shown and described on the drawings, in the Borough of Manhattan, New York City. Chelsea Houses will consist of two 21-story buildings containing 424 apartments; superstructures of reinforced-concrete construction.

No prequalication is required for these contracts.

The Authority will welcome inquiries from contractors, which should be directed to the Construction Department, New York City Housing Authority, 299 Broadway, New York 7, N. Y. (DIgby 9-4310, extension 521).

NEW YORK CITY
HOUSING AUTHORITY
William Reid, Chairman

*The Authority reserves the right to postpone the bid date.

Bids: November 28, 1961

The Port of New York Authority
Teterboro Airport

REHABILITATION OF HEATING SYSTEM
HANGAR NO. 3
CONTRACT O & M 684

Sealed proposals for the rehabilitation of the heating system in Hangar No. 3 at Teterboro Airport, Teterboro, New Jersey will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M. o'clock Tuesday, November 28, 1961, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of Proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt
Chairman

New York, 11/8/61

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5698) will be received at Ephrata, Washington, until 10 a.m., Pacific Standard Time, December 7, 1961, for furnishing labor and materials for Earthwork and Structures, Block 23, Laterals and Wasteways, Wahluke Branch Canal Laterals, Columbia Basin Project, Washington. Location near Othello, Washington, in Franklin County. Principal items are 956,000 cu. yds., excavation; 207,000 cu. yds., earth lining; 10,800 lin. ft., concrete pipe; 935 cu. yds., concrete in structures; and other work. Completion time 365 days. For particulars, address Bureau of Reclamation, 735 East Main Street, Othello, Washington; P. O. Box 937, Boise, Idaho; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

EMPLOYMENT OPPORTUNITIES

ADDRESS BOX NO. REPLIES TO: Box No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 645 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

• *POSITIONS VACANT*

Electric Systems Engineer—Midwestern consulting engineerin firm has challenging opportunity in electric systems planning. Work includes network analyzer, sectionalizing and economic feasibility studies. Permanent employment offered to man with 3 to 5 years experience. Submit resume and salary requirements to Stanley Engineering Company, Muscatine, Iowa.

Field Engineer — Permanent position with established Midwest consulting firm for man thoroughly qualified and experienced in all branches of building construction. Moving expenses paid. Electrical or process engineer preferred. Send complete resume to P-7633, Engineering News-Record.

Process Piping Engineer for full or part time work. Telephone—CO 2-5005 Paramus, New Jersey.

Estimator — Experienced for general contractor specializing in commercial, light-heavy industrial construction. Please send resume, photo and vital statistics—Location Mid-South—salary and percentage. All replies confidential. P-7656, Engineering News-Record.

Pipe fitter foreman. Experienced in Steam and Air Conditioning Piping. Metropolitan N. Y. area. P-7642, Engineering News-Record.

Guard Rail Superintendent. Must be familiar with all phases of guard rail construction and be able to procure and train capable foremen and operators. Send complete resume including salary requirements to P-7614, Engineering News-Record.

Water Works Engineer—Graduate with degree in Sanitary Engineering, or Chemistry, for water works management company; 5-10 years experience in investigation, design and supervision of purification facilities. Location: Philadelphia, Pa.; some travel. P-7700, Engineering News-Record.

Highway Engineers and Structural Designers. Experienced. Send resume and salary requirements. Frederic A. Nassaux & Assoc., 312 Trust Bldg., Chambersburg, Penns.

Draftsmen, Structural-Experienced checkers and detailers of structural steel shop dwgs. Relocation expenses. Fink and Zwecker Co., 1100 Crescent Ave., N.E., Atlanta 9, Ga.

Civils—Water Resources Planning, domestic and foreign opportunities with expanding consulting firm for irrigation and hydroelectric engineers and hydrologist, minimum 5 years experience. Send resume and salary desired. P-7732, Engineering News-Record.

General Superintendent for established General Contractor in highway and heavy construction. Doing a volume of approximately $10,000,000.00 per year. Ohio and Kentucky area. Excellent opportunity for man with previous experience as General Superintendent or as Superintendent with responsible charge of highway and heavy construction projects. Must be fully qualified including formal training and experience in supervision, planning and control of highway and heavy construction jobs. P-7743, Engineering News-Record.

Highway Engineers for work in Saudi Arabia. Should be able to locate, survey, design and supervise construction of bituminous roads in rugged terrain. H. W. Lochner, Inc., 20 North Wacker Drive, Chicago 6, Ill.

Architect for small mid west A-E office. Start on salary plus percentage—lead to share in firm. P-7738, Engineering News-Record.

Wanted—Civil Engineer capable of applying engineering and administrative knowledge to the development, construction and maintenance of public works projects. Must have a degree in Civil Engineering and have experience in design and construction of streets, sewers, water lines, and other municipal public works activities. Salary $7119 to start. Send resume of education and experience to Personnel Director, City Building, Middletown, Ohio.

Civil, Structural, Sanitary Design Engineers wanted by Illinois consulting firm. Salaries from $7000, depending upon ability. Permanent positions with paid vacation, sick leave, and profit-sharing plan. Unlimited opportunities for aggressive personnel. P-7751, Engineering News-Record.

Civil Engineer, graduate or registered. Experienced in field control of highway construction and materials. Complete chronological resume requested. Salary appropriate to age and experience. P-7661, Engineering News-Record.

Design Engineer experienced Belt Conveyor & related material handling installations. Submit resume. P-7786, Engineering News-Record.

(Continued on opposite page)

TECHNICAL SUPERVISOR

Allied Chemical's building products unit—Barrett Division—has an opportunity for an engineering graduate, offering considerable scope and challenge.

The man we seek will be concerned with quality of paving materials—specifically, paving mixes including selection of desirable aggregates, the characteristics of road asphalts and tars, as well as state highway specifications.

Headquarters will be in New York but frequent trips to mix plants and quarries will be required.

Please send resume to Personnel Manager

Barrett Division

ALLIED CHEMICAL CORP.

40 Rector Street, New York 6, NY

POSITIONS VACANT

(Continued from opposite page)

C.P.A.—Years of experience in construction and taxes. Must be top man for top, steady position. P-7712, Engineering News-Record.

Structural Engineer—Architectural, Civil, or Mechanical Engineer interested in conducting research on uses of light-gage steel in commercial and residential structures and associated building applications. Work involves development of program, design, analysis, production techniques and performance testing. Large Research Laboratory, Pittsburgh, Pennsylvania. Background in research or product development desirable. M.S. or B.S. degree required. Submit resume and salary requirements to P-7768, Engineering News-Record.

Sanitary Engineer experienced in sewerage, water supply and possibly industrial wastes, incineration, for established consulting sanitary engineering firm. Opportunity for permanent position and profit sharing. Send complete resume and salary required. Replies held in strict confidence. Morgenroth & Associates, Inc., 294 Washington St., Boston 8, Mass.

National Limestone Institute has challenging position for engineer with background in highway field. Excellent growth potential. Send complete resume with salary requirements to N.L.I., 210 H St., N.W., Wash. 1, D. C.

Mechanical Superintendent experienced in water and sewage treatment plant installations Eastern United States with 50 year old firm. Reply P-7779, Engineering News-Record.

Structural engineer (P.E.). Min. 5 yrs. experience designing building frames and foundations. Send resume, salary expected, references, availability to Snyder & Troxel, Consulting Engineers, 300 Denison Bldg., Syracuse, N. Y.

Mechanical Estimator—To estimate heating, air conditioning, piping for mechanical contractor in St. Louis, Missouri. Submit work resume, recent photo, salary desired. P-7757, Engineering News-Record.

Flood Control Engineer—Will be Chief Engineer and General Manager of Maricopa County Flood Control District. Salary $9348-11,364. Must be Registered. Send resume to Maricopa County Personnel Dept. 126 West Madison, Phoenix, Arizona.

• *EMPLOYMENT SERVICES*

"NER" describes hundreds of $7,000-$35,-000 Executive job openings monthly. Write for free copy. National Employment Reports, 105 W. Adams, 830-B, Chicago 3.

• *POSITIONS WANTED*

Layout Eng. or party chief-clerk of works, diversified expr., will travel, location immaterial—single. PO Box 949, Hollywood, Fla.

BSCE, age 30, 5 yrs exp. as field construction supervisor for public utility. Exp. in constr. of power houses, commercial bldgs. Inspection, scheduling, coordinating, expediting, estimating, design. Prefers location eastern states. PW-7689, Engineering News-Record.

Structural Designer: Experienced in heavy steel and concrete structures as railroad, petroleum refineries, copper mine, and railroad bridges. Some highway bridge work. Graduate engr. Prefer So. Cal. or Gulf States. Consider other. PW-7692, Engineering News-Record.

Chief Estimator, graduate civil engineer, 38. Excellent field experience from field engineer to project manager. PW-7715, Engineering News-Record.

(Continued on following page)

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

DISPLAYED RATE:

The advertising rate is $39.20 per in. for all adv. appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

UNDISPLAYED RATE:

$2.40 per line, min. 3 lines. To figure advance payment count 5 aver. words as a line.
Position Wanted ads take ½ of above rate.
Box numbers—count as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.

CONSTRUCTION

PHILCO

Immediate openings available for qualified personnel to advise and instruct in the following areas:

ROAD MAINTENANCE, DRAINAGE AND BRIDGE APPROACH SPECIALISTS
Design and installation of military road and airfield drainage systems.

BRIDGING—FIXED, PANEL & FLOATING SPECIALISTS
Construction and emplacement of bridge components. Utilization of engineer equipment such as outboard motors, power shovels, pneumatic tools, etc. Dismantling of bridges and ferries, storage of salvage. Must have M4T6 experience.

ENGINEER EQUIPMENT OPERATION AND MAINTENANCE SPECIALISTS
Operation and maintenance techniques for heavy engineer equipment including cranes, shovels, graders, rollers, ditchers, crushers and asphalt equipment.

ENGINEER EQUIPMENT MAINTENANCE AND REBUILD SPECIALIST
Extensive repair and rebuilding of power shovels, rock crushers, cranes, graders, pneumatic tools, air compressors and quarry equipment. Use of maintenance publications, parts lists, systems of identification and power tools.

PRESERVATION, PACKAGING AND PACKING SPECIALIST
Current methods of cleaning, rehabilitating, preserving, packing and in-storage maintenance of construction engineering parts and material.

SALARIES TO $12,000

Positions are located in Viet Nam and offer many outstanding benefits.
Must be U.S. Citizen.

Interested candidates please submit resume, in confidence, to—
MR. J. H. VOLZ

PHILCO TECHREP DIVISION

P. O. Box 4730 **Phila. 34, Pa.**

An Equal Opportunity Employer

THERMAL POWER STATIONS
PROJECT SUPERINTENDENTS
ASSIST. PROJECT SUPERINTENDENTS
Civil—Mechanical—Electrical
START AND TEST ENGINEERS
SHIFT OPERATORS
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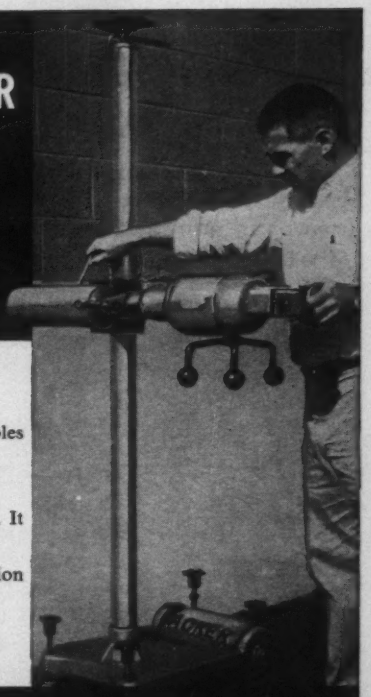

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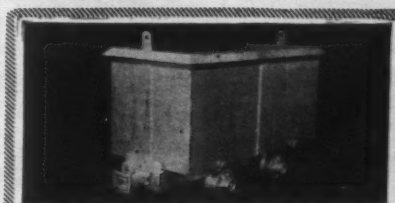

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A Turning Point

THE ANSWER TO KHRUSHCHEV'S cruelly calculated and hypocritically staged attempt to terrorize the world by detonating a giant nuclear bomb is crystal clear: Continue to do what we have been doing to keep our military might greater than his, but do what we have to do faster and with less fuss. And in accomplishing this, all those who labor in construction, whether as engineers, architects, contractors or craftsmen, have vital roles to play.

Explosion of the big bomb may have backfired on the USSR as a weapon of propaganda. Instead of spreading terror, Khrushchev's monstrous display of disdain for world opinion should solidify our determination to persuade him that crime can't pay. And all but the willfully or hopelessly blind will see that such persuasion can only be accomplished if backed up by definite military superiority on our part.

The task for the construction industry is to provide the facilities that will be necessary to maintain and increase this superiority. Included may be more efficient and more bomb-resistant missile bases, facilities for building and launching anti-missile missiles, space projects and submarine bases. Even new test facilities for atmospheric explosions of nuclear bombs may have to be built if they are deemed necessary.

Such positive action, more than the negative response of building blast and fallout shelters, offers the best hope for peace. Military superiority should be our first and main line of defense. Nevertheless, shelters will have to be built, against the off-chance of a Soviet gamble on nuclear war or just as a supplementary weapon in our arsenal. Some sort of a realistic program seems bound to emerge soon (see p. 21).

Khrushchev's big bomb blast should mark a turning point. Henceforth, his motives and methods should never again be doubted. Discarding appeasement and resisting terror, U.S. policy must stick with negotiation from a position of growing strength.

And for their part in assuring this growth in strength, all elements of the construction industry should tackle their appointed tasks in the same purposeful, united way that they did after Pearl Harbor. That was a turning point, too.

The Shadow of the Boss

MANY ENGINEERS WILL AGREE with Jacob Feld's comment that what is missing in construction today is the "shadow of the boss" (see p. 50). When no resident engineer or qualified inspector casts his shadow on the construction scene, the consequence is often shoddy construction, sometimes collapse.

Unless they provide field supervision, engineers are more in the business of selling design drawings than in providing professional services. This is a mistake, whether the engineer purposefully avoids doing the inspection work or whether his fee is kept so low he can't afford it. The kind of inspection usually specified on low-fee engineering jobs—e.g., "periodic visits to the site"—often amounts to a mere gesture. To be effective, inspection requires an engineer or qualified inspector on the spot with plans and rule.

Technical control, the solution proposed by Mr. Feld, would work much like the fire underwriting inspection service, but in the field of construction collapse and structural failure insurance. It would strengthen the motives for rigorous field inspection by making penalties tangible: Insurance companies would have to pay for laxity in technical control. Most important, this system would appropriate funds to pay for effective inspection and review throughout the planning and construction stages. The idea deserves industrywide consideration.

Hydro With Pumps

A BOOM IN HYDRO CONSTRUCTION that exploits not a kilowatt of natural waterpower is the intriguing picture conjured up by a suggestion made at the recent pumped storage symposium held by the American Society of Civil Engineers (ENR Oct. 26, p. 22). Frank E. Jaski, of Allis-Chalmers Manufacturing Co., said, ". . . pumped-storage hydropower can even surpass the total capacity of conventional hydropower in use today."

The excuse, of course, for such bold optimism, in the face of the steady decrease in the number of good hydro sites, is that with pumped storage only enough natural flow is needed to fill the reservoir initially—and then to replace water lost by evaporation, seepage, etc. The water functions simply like the weight that, instead of a spring, drives some cuckoo clocks. Like the weight, the water is lifted to charge the system with energy and allowed to fall to recover the energy. Like the weight, the same water is used again and again.

Unlike the weight, pumped storage can't be installed just anywhere. The site requirements are quite demanding. And it must be applied in a system that can make a profit out of swapping a given quantity of pumping energy during low-demand periods for a significantly smaller return of generating energy during high-demand periods. For pumped storage is a net consumer rather than a net producer of energy in a system.

But with the stimulus both of new equipment developments and of increasing interest and activity in pumped storage on the part of engineers and utility firms, suitable sites will turn up. The search for them has been taken up recently, in fact, by two of the most prolific hydro developers in this country, the Corps of Engineers and the Bureau of Reclamation.

The advent of a new hydro age, if it comes, will be interesting to watch.

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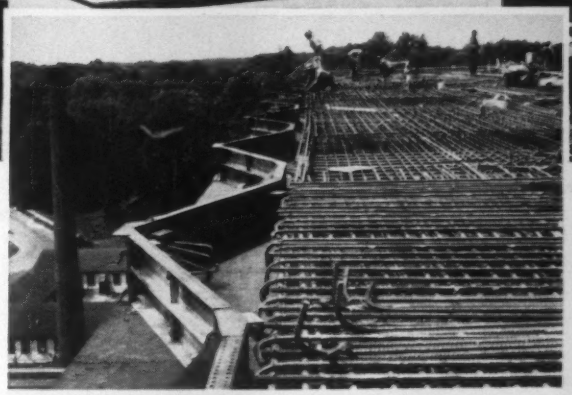

DENSE NETWORK OF REBARS—14 lb. per sq. ft.—is shown in this floor slab section. Column spacing is 24 and 36 feet. Architect: A. G. Odell, Jr. & Associates • Structural Engineer: W. H. Gardner, Jr. & Associates • General Contractor: Little Construction Co., • POZZOLITH Ready-Mix Concrete: Concrete Supply Co.

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*POZZOLITH *is a registered trademark of The Master Builders Co. for its ingredient for concrete which provides maximum water reduction, controls rate of hardening and increases durability.*